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13. Abstract *(Maximum 200 Words)* *(abstract should contain no proprietary or confidential information)*
This report summarizes activities and accomplishments during the third year of a four year training program in biopsychosocial breast cancer (BC) research. Three trainees (1 postdoctoral; 2 predoctoral) were reappointed to the training program in July, 2001. Research training was furnished by a multidisciplinary faculty of six. The training program consists of 5 components, all of which were successfully implemented during 2001-2002. Training faculty and trainees participated in a biweekly BC seminar which allowed for oversight of trainee activities, didactic presentation of clinical aspects of BC, and discussion of ongoing and anticipated BC-related research projects. Trainees also received supervised guidance in all phases of the research enterprise. Specifically, trainees participated in: (1) development and implementation of one group research project; (2) ongoing data collection, preparation, and analysis for 2 other ongoing group projects; and (3) manuscript preparation for 3 completed research projects. Both predoctoral trainees completed didactic course requirements. One new predoctoral and 1 new postdoctoral trainee were recruited and appointed for 2002-2003. One current predoctoral and 1 current postdoctoral trainee were reappointed for 2002-2003.

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Introduction

High quality research investigating various psychosocial and behavioral aspects of breast cancer has the potential to reduce breast cancer-related mortality as well as improve quality of life following breast cancer (BC). Critical to the performance of high quality research in this area is the recruitment and training of new researchers. This report summarizes activities and accomplishments during the third year of a four year research training program in biopsychosocial aspects of BC. The training program is centered in the Department of Behavioral Science, a basic science department in the University of Kentucky College of Medicine. A multidisciplinary training faculty of six is drawn from three academic units within the College of Medicine (Behavioral Science, Medicine-Hematology/Oncology, and Nursing). Funding is provided to support the research training of two predoctoral trainees and one postdoctoral trainee each year. Trainees engage in a variety of supervised research, experiential, and didactic activities under the supervision of training program faculty.

Body

The research training program was initiated on July 1, 1999. This report describes grant-related activities conducted during the third year of project funding from July 1, 2001 through June 30, 2002. Following is a summary of activities associated with each of the third project year tasks outlined in the approved Statement of Work.

Task 1: Implementation of Research Training Program

The training program consists of five basic components: (1) training in research design, methods, and analysis through supervised participation in BC-related research; (2) formal coursework; (3) individual tutorial in BC-related research; (4) participation in a monthly BC seminar; and (5) education regarding biological and medical aspects of BC. Each of these components was effectively implemented during project year three of the training program.

Predoctoral trainees in the program are required to complete two specific graduate level courses (component #2 from above). These include a course in "Psychosocial Oncology" and a course in "Integrated Research Methods." Both predoctoral trainees supported during project year three had successfully completed the course in "Integrated Research Methods" during the spring semester of 2001. Both trainees successfully completed the course in "Psychosocial Oncology" during the fall semester of 2001. Thus, both predoctoral trainees supported during project year three have successfully completed all didactic course requirements associated with this DOD-funded research training program in biopsychosocial BC research.

A monthly BC seminar has been conducted as one of the core components of the training program since the inception of the training program in July, 1999 (component #4 from above). This BC research seminar involves both trainees and training program faculty. Other faculty, graduate students, and postdoctoral trainees from the Department of Behavioral Science interested in biopsychosocial BC research are also invited to attend on an ad hoc basis. This

monthly BC research seminar was **expanded** to a biweekly format (i.e., twice per month) during this past year. This expansion of the BC seminar was done based on expressed interest in doing so on the part of trainees. Each meeting of this this BC research seminar lasted for roughly 60-75 minutes. This BC research seminar provided: (a) an opportunity for all members of the training program to keep abreast of the research activities of the trainees; (b) a forum for training faculty and trainees to discuss recent and ongoing research in biopsychosocial aspects of BC; (c) an opportunity for faculty and trainees to discuss ideas leading to the development of new BC-related research projects at the University of Kentucky; (d) an opportunity for didactic instruction regarding medical and clinical aspects of BC; and (e) an opportunity for trainees to practice and receive feedback on oral presentations they were scheduled to make at upcoming national research conferences.

The training plan provides for education regarding biological and medical aspects of BC to provided through both didactic instruction and experiential activities (component #5 from above). The monthly seminar provided an opportunity for trainees (and program faculty) to share and learn basic medical information regarding BC. In addition, all trainees participated in various experiential activities. These included attendance at integrative patient conferences conducted by the University of Kentucky Comprehensive Breast Care Center as well as "shadowing" of clinicians and BC patients as they are involved in the provision and receipt of medical treatment of BC.

During project year three of the training program, both pre- and postdoctoral research trainees were actively involved in specific research projects under the supervision of training program faculty (component #1 from above). Research projects were either "communal" projects in which all trainees participated or were "individual" research projects which were developed and implemented largely by a single trainee. During project year three of the training program, one new communal research projects was developed and will be implemented upon receipt of IRB approval. This project is an internet-based study of health and psychosocial behavior change following a cancer diagnosis, in this case, a breast cancer diagnosis. All predoctoral and postdoctoral trainees participated in the development of this new communal research project.

In addition, all predoctoral and postdoctoral trainees participated in two ongoing communal projects which were implemented in prior years of the training program. These ongoing communal projects include: (a) a prospective and longitudinal study of fatigue during and following treatment for breast cancer; and (b) a psychosocial needs assessment of women being seen at the University of Kentucky Comprehensive Breast Care Center. Trainee involvement in these two ongoing communal research projects ranged across several phases of the research enterprise including data collection, data entry and preparation, data analysis, and manuscript preparation.

In addition to these two ongoing communal research projects, pre- and post-doctoral trainees participated in data analysis and manuscript preparation activities associated with two completed breast cancer-related research projects. These included: (a) a longitudinal study of women's psychological and behavioral responses to the experience of a benign breast biopsy; and (b) a

cross-sectional laboratory-based study of emotional expressivity in BC survivors and age- and education-matched women without a history of breast cancer.

Finally, one additional individual research project was completed during project year three of the training program. John Schmidt, a predoctoral trainee, completed his master's thesis reearch. His theses research involved a web-based study of dispositional and social factors in psychological adjustment to breast cancer diagnosis and treatment. In this project, Mr. Schmidt assumed full responsiblity for all aspects of development and implementation, data analysis and write-up, thus providing him with supervised experience in all aspects of the research endeavor. Mr. Schmidt prepared and submitted a manuscript based upon his thesis research during project year 3.

Task 2: Recruitment of Research Trainees for Project Year 4

During the spring of 2002, we initiated a recruitment process to fill one available postdoctoral trainee position and one available predoctoral trainee position. Both positions were available for the 2002-2003 year (project year 4). Availability of the predoctoral training position was advertised campus-wide and an individual was selected and offered the available position upon review of applications. John Salsman, a doctoral candidate in clinical psychology, accepted our offer of appointment to the training program. He began his predoctoral appointment July 1, 2002.

Availability of a postdoctoral training position was advertised in several national professional print publications. The position announcement was also posted to numerous internet websites and was e-mailed to an extensive list of professional colleagues in the social and behavioral sciences. The position announcement was also posted on our departmental website. A total of 10 applications for the position were received. Two candidates were invited to campus for interviews. One candidate (female) was completing her doctoral degree in social health psychology at Kent University. The other candidate (female) was completing her doctoral degree in clinical psychology at Virginia Tech University. The latter candidate was selected and offered the position. Kristi Graves accepted our offer of a postdoctoral research training position and will begin her appointment to the training program on August 6, 2002.

The postdoctoral trainee during the 2001-2002 academic year, Abbie Beacham, requested reappointment for 2002-2003. Upon review, it was decided that she was making adequate progress in the training program and Dr. Beacham was reappointed.

One of the predoctoral trainees during the 2001-2002 academic year, John Schmidt, also requested reappointment for 2002-2003. Upon review, it was decide that he was adequate progress in the program and Mr. Schmidt was reappointed. One of the predoctoral trainees during the 2001-2002 academic year, Julie Bollmer, did not request reappointment to the research training program. Rather, she applied for and was awarded a prestigious University of Kentucky Presidential Graduate Fellowship for 2002-2003. Ms. Bollmer's participation in our

breast cancer research training program from 2000-2002 provided her with a solid foundation which enabled her to compete successfully for this prestigious Presidential Graduate Fellowship.

Key Research Accomplishments During Project Year Three

- Recruitment of a new postdoctoral trainee (Graves) and a new predoctoral trainee (Salsman).

- Review and reappointment of one continuing postdoctoral trainee (Beacham) and one continuing predoctoral trainee (Schmidt).

- Both predoctoral trainees (Schmidt, Bollmer) complete didactic course requirements.

- Publication of two manuscripts in peer-reviewed journals based upon research conducted in association with training grant (Andrykowski et al., 2001; Mager & Andrykowski, 2002).

- One manuscript accepted for publication in a peer-reviewed journal based upon research conducted in association with training grant (Andrykowski et al., in press).

- Two manuscripts submitted for publication in peer-reviewed journals based upon research conducted in association with training grant (Beacham et al., 2002; Schmidt & Andrykowski, 2002).

- Publication of five abstracts in peer-reviewed journal based upon research conducted in association with training grant (Averill et al., 2002; Beacham et al., 2002; Beacham et al., 2002; Bollmer et al., 2002; Schmidt et al., 2002).

- Postdoctoral trainee's (Beacham) research abstract selected for oral, platform presentation at annual meeting of Society of Behavioral Medicine.

- Predoctoral trainee's (Bollmer) research abstract selected for presentation at special poster session at annual meeting of Society of Behavioral Medicine honoring outstanding predoctoral investigators.

- Development of one new communal breast-cancer related research project.

- All three trainees attend and participate in national professional conference (annual meeting of the Society of Behavioral Medicine)

- Successful implementation of all five components of training program

Reportable Outcomes

(Note that all outcomes listed below are only those occurring during project year three and include only outcomes associated with trainees supported during project years one, two, and three. Names of DOD-supported trainees are in bold.)

Manuscripts published in peer-reviewed journals:

Andrykowski, M.A., Carpenter, J.S., Studts, J.L., Cordova, M.J., Cunningham, L.J., **Mager, W.M.**, Sloan, D., Kenady, D., & McGrath, P. (2001). Adherence to recommendations for clinical follow-up after benign breast biopsy. Breast Cancer Research and Treatment, 69, 175-178.

Mager, W.M., & Andrykowski, M.A. (2002). Communication in the cancer "bad news" consultation: Patient perceptions and psychological adjustment. Psychooncology, 11, 35-46.

Manuscripts accepted for publication in peer-reviewed journals:

Andrykowski, M.A., Carpenter, J.S., **Studts, J.L.**, Cordova, M.J., Cunningham, L.J., **Beacham, A.O.**, Sloan, D., Kenady, D., & McGrath, P. (in press). Psychological and behavioral sequelae of benign breast biopsy: A longitudinal, comparative study. Health Psychology.

Published Abstracts :

Averill, A., **Beacham, A..O.**, & Andrykowski, M.A. (2002). Psychosocial concerns and clinical program interests of women at a comprehensive breast care center. [abstract] Annals of Behavioral Medicine, 24 (Suppl.), S175.

Beacham, A.O., Andrykowski, M.A., Malik, U., & Jacobsen, P.B. (2002). Longitudinal analysis of exercise patterns in women receiving adjuvant treatment for breast cancer. [abstract] Annals of Behavioral Medicine, 24 (Suppl.), S176.

Schmidt, J., Beacham, A., Bollmer, J., Malik, U., Andrykowski, M.A., & Jacobsen, P. (2002). Evaluation of the Diagnostic Interview for Cancer-Related Fatigue (DICRF) in women with breast cancer. [abstract] Annals of Behavioral Medicine, 24 (Suppl.), S172.

Beacham, A.O., Andrykowski, M.A., Malik, U., & Jacobsen, P.B. (2002). Exercise attenuates fatigue severity ratings in women receiving chemotherapy for breast cancer. [abstract] Annals of Behavioral Medicine, 24 (Suppl.), S219.

Bollmer, J.M., Beacham, A.O., Schmidt, J.E., Malik, U., Andrykowski, M.A., & Jacobsen, P. (2002). Longitudinal study of fatigue after adjuvant treatment for breast cancer. [abstract] Annals of Behavioral Medicine, 24 (Suppl.), S005.

Degrees obtained based on training supported by award:

John Schmidt, Ph.D., a predoctoral trainee during project years one and two completed the requirements for his M.S. degree in Clinical Psychology from the University of Kentucky in April, 2002.

Employment opportunities received based on training supported by award:

Jamie Studts, Ph.D., a predoctoral trainee during project year one, was appointed as an assistant professor in the Department of Internal Medicine and the James Graham Brown Cancer Center at the University of Louisville. His appointment began July 16, 2001.

Conclusions

All three trainees supported during project year two (2000-2001) were reappointed for project year three (2001-2002). Each of the five components of the research training program was effectively implemented during project year three of the training program. All three trainees received supervised, "hands on" experience in all aspects of conducting biopsychosocial breast cancer-related research. In addition, all three trainees had the opportunity to participate in a variety of specific research projects, thus increasing the breadth of their experience. Finally, all three trainees had the opportunity for extensive interaction with both patients and health providers in the breast cancer care setting. Following review of the progress and activities of two of the trainees, it was decided to reappoint each to an additional year of research training beginning July, 2002. The other trainee did not request reappointment as she was appointed to a prestigious University of Kentucky Presidential Graduate Fellowship for 2002-2003. We successfully recruited and appointed one new predoctoral and one new postdoctoral trainee for the the fourth project year (2002-2003).

References (Research trainees supported by DOD training program in bold)

Andrykowski, M.A., Carpenter, J.S., **Studts, J.L.**, Cordova, M.J., Cunningham, L.J., **Beacham, A.**, Sloan, D., Kenady, D., & McGrath, P. (in press). Psychological and behavioral sequelae of benign breast biopsy: A longitudinal, comparative study. Health Psychology.

Andrykowski, M.A., Carpenter, J.S., **Studts, J.L.**, Cordova, M.J., Cunningham, L.J., **Mager, W.M.**, Sloan, D., Kenady, D., & McGrath, P. (2001). Adherence to recommendations for clinical follow-up after benign breast biopsy. Breast Cancer Research and Treatment, 69, 165-178.

Averill, A., **Beacham, A..O.**, & Andrykowski, M.A. (2002). Psychosocial concerns and clinical program interests of women at a comprehensive breast care center. [abstract] Annals of Behavioral Medicine, 24 (Suppl.), S175.

Beacham, A.O., Andrykowski, M.A., Malik, U., & Jacobsen, P.B. (2002). Longitudinal analysis of exercise patterns in women receiving adjuvant treatment for breast cancer. [abstract] Annals of Behavioral Medicine, 24 (Suppl.), S176.

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Bollmer, J.M., Beacham, A.O., Schmidt, J.E., Malik, U., Andrykowski, M.A., & Jacobsen, P. (2002). Longitudinal study of fatigue after adjuvant treatment for breast cancer. [abstract] Annals of Behavioral Medicine, 24 (Suppl.), S005.

Mager, W.M., & Andrykowski, M.A. (2002). Communication in the cancer "bad news" consultation: Patient perceptions and psychological adjustment. Psychooncology, 11, 35-46.

Schmidt, J., Beacham, A., Bollmer, J., Malik, U., Andrykowski, M.A., & Jacobsen, P. (2002). Evaluation of the Diagnostic Interview for Cancer-Related Fatigue (DICRF) in women with breast cancer. [abstract] Annals of Behavioral Medicine, 24 (Suppl.), S172.

Appendix

Two publications in peer-reviewed journals based upon research supported by the research training program were published during the third project year. Copies of these two publications have been included in the appendix (Andrykowski et al., 2001; Mager & Andrykowski, 2002).

One manuscript based upon research supported by the research training program was accepted for publication in a peer-reviewed journal during project year three. A copy of this manuscript is included in the appendix (Andrykowski et al., 2002).

Five abstracts based upon research supported by the research training program were published in peer reviewed journals during the third project year. Copies of these five abstracts have been included in the appendix (Averill et al., 2002; Beacham et al., 2002; Beacham et al., 2002; Bollmer et al., 2002; Schmidt et al., 2002).

Two additional manuscripts based upon research resulting from training program activities were submitted for publication in peer reviewed scientific journals during project year three. These two manuscripts are currently undergoing editorial review at the time of this writing (Beacham et al., 2002; Schmidt & Andrykowski, 2002). Should these manuscripts be accepted for publication, copies will be included in a future annual report.

A-6

PAIN: A BARRIER OR OUTCOME IN AN EXERCISE PROGRAM FOR THE ELDERLY?

Jamie L. Rhudy, M.S., Patricia M. Dubbert, Ph.D., Kent A. Kirchner, M.D., University of Mississippi Medical School and VAMC Jackson, M.S., Karen M. Cooper, F.N.P., and Deborah Bilbrew, R.N., VAMC Jackson

Programs to increase home-based physical activity (PA) in the elderly are important for reducing functional impairments and health complications. Unfortunately, little is known about the role of pain in such programs. Indeed, two negative consequences of pain are possible: it can be a barrier to increasing PA, and/or it can result from increased PA. The present study examined the role of pain in a program designed to increase walking in 163 older adults (60-80 yrs) enrolled in VA primary care clinics. Self-reported PA (min walking/week) and pain (WPSI pain items) were collected at baseline, 6 months, and 12 months. At baseline, 82.8% of participants reported a history of arthritis, with 61% having daily pain. Generally, mean PA increased over time and pain decreased. Zero-order correlations indicated that pain was negatively related to activity level only at 6 months. However, hierarchical regression analyses controlling for prior PA level found that pain was not a significant predictor of future PA, suggesting that PA was not significantly influenced by pain. Furthermore, walking was not a significant predictor of future pain after controlling for previous pain, suggesting that increased PA did not increase pain. In sum, the present study suggests pain is neither a barrier nor a negative outcome of programs designed to increase walking in the elderly. In fact, zero-order correlations and a non-significant trend in mean levels suggest that increased walking may decrease pain.

This study was supported by VA HSR&D.

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A-7

USE OF THE NEO-FIVE FACTOR INVENTORY WITH OROFACIAL PAIN PATIENTS

John Schmidt, B.S., Ruth Baer, Ph.D., Reny De Leeuw, D.D.S., Ph.D., and Charles Carlson, Ph.D.

Understanding the relationship between personality traits and the experience of chronic pain may improve pain management outcomes. This study examined the use of the NEO-Five Factor Inventory (NEO-FFI) in chronic orofacial pain patients. Participants were 191 consecutive patients (mean age = 38.2, SD = 13.1) seen between September 2000 and May 2001. Patients completed measures of psychological distress (SCL-90-R), personality (NEO-FFI), pain (MPI), sleep disturbance (PSQI), activity (BAQ), and traumatic experiences (PCL-C). Patients reported an average pain severity of 39.9 (SD = 15.1) as assessed by the MPI, with an average duration of 57.5 (SD = 87.5) months. Pain severity was significantly related to Neuroticism ($r=.17$; $p<.05$), Extroversion ($r=-.17$; $p<.05$), and Agreeableness ($r=-.15$; $p<.05$), but not to Openness and Conscientiousness (p's>.05). All dimensions of the SCL-90-R were significantly correlated with N, E, A, and C (p's <.01), but not with O (p's>.05). Life interference, life control, and affective distress, as assessed by the MPI, were related to N and E (p's<.01). Patients classified by the MPI as dysfunctional or interpersonally distressed were more likely to score above average on N (2 =9.3, p<.01), and below average on E (2 = 4.5, p<.05) and C (2 = 6.5, p<.05), than those classified as adaptive copers. Additionally, patients scoring high on N and low on E experienced poorer sleep, more life stressors, and greater psychological distress (p's<.05) than patients scoring low on N and high on E. These results suggest that personality assessment data may contribute to improved understanding of orofacial pain patients.

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A-8

LONGITUDINAL STUDY OF FATIGUE AFTER ADJUVANT TREATMENT FOR BREAST CANCER

Julie M. Bollmer, M.A., Abbie O. Beacham, Ph.D., John E. Schmidt, B.S., Uzma Malik, M.D., Michael Andrykowski, Ph.D., University of Kentucky College of Medicine; and Paul Jacobson, University of South Florida

While fatigue is a prominent symptom during and following treatment for breast cancer (BC), most research has been cross-sectional. This longitudinal study followed women with early stage BC through an initial course of adjuvant radiation (RT) (n = 36) or chemotherapy (CT) (n = 39). Depressive symptoms (CESD), quality of life (QOL) (MOS-36), and fatigue (Fatigue Symptom Inventory (FSI)) were assessed before adjuvant treatment (baseline) and at completion of either RT or CT adjuvant therapy. Repeated measures TIME x GROUP ANOVAs revealed main effects for TIME for MOS-36 vitality and social and role functioning dimensions (ps < .05), and several FSI indices, including the disability subscale (ps < .05). Poorer QOL and more fatigue were evident at completion of treatment than at baseline. Main effects for GROUP were evident for depressive symptoms (CESD), MOS-36 pain and role and social functioning dimensions, and FSI indices of peak fatigue and number of days fatigued (ps < .05). More depression and fatigue and poorer QOL were evident in the CT group. Finally, significant GROUP X TIME interactions were obtained for MOS-36 dimensions of physical functioning and general health (ps < .05). While no group differences existed at baseline, the CT group evidenced poorer status at the end of adjuvant treatment. Results suggest that while both RT and CT negatively impact indices of QOL, depression, and fatigue, CT may have a greater negative impact upon physical functioning and perceptions of general health relative to RT.

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A-9

PERCEIVED EMOTIONAL CONTROL AND OPTIMISM IN WOMEN WITH NEWLY DIAGNOSED BREAST CANCER

Alison M. Carpenter, B.A., Ellen I. Beckjord, B.S., Marne L. Sherman, Ph.D. and Bruce E. Compas, Ph.D.

Research examining the relationship of perceived control and optimism with emotional adjustment to breast cancer has yielded mixed results. One recent study indicates that optimism is a strong predictor of emotional well-being while perceived control is not (Carver et al., 2000). The present study further examines these relationships in 129 newly diagnosed, Stage 0-III breast cancer patients (98.1% Caucasian, mean age 53 years). Perceived emotional control was measured using the Multidimensional Measure of Control (Glinder, Compas, & Langrock, 2001). The Positive (PA) and Negative (NA) Affect Schedule (Watson, Clark & Tellegen, 1988)and the Life Orientation Test (Carver & Sheier, 1994) were used to measure affect and optimism. All measures were correlated (p<.01), indicating a relationship between control, optimism and affect. In hierarchical multiple regression analyses, optimism (Beta=.43) and emotional control (Beta=.36) accounted for significant variance in PA, with the variance accounted for by optimism (RsqCh=16.4%) significantly attenuated when control was entered first in the equation (RsqCh=5.2%) indicating partial mediation. Parallel analyses show that in the prediction of NA, optimism (Beta=-.34) and emotional control (Beta=-.47) were significant predictors, but variance accounted for by optimism (RsqCh=11.5%) was no longer significant (RsqCh=1.3%) when accounting for emotional control, demonstrating a mediated model. Results indicate that optimism and perceived emotional control are important predictors of emotional adjustment to breast cancer, and that the relationship between optimism and affect in women with newly diagnosed breast cancer can be partially accounted for by perceived control over one's emotions.

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E-38

EVALUATION OF THE DIAGNOSTIC INTERVIEW FOR CANCER-RELATED FATIGUE (DICRF) IN WOMEN WITH BREAST CANCER

John Schmidt, B.S., Abbie Beacham, Ph.D., Julie Bollmer, M.A., Uzma Malik, M.D., Michael Andrykowski, Ph.D., University of Kentucky College of Medicine; and Paul Jacobsen, Ph.D., University of South Florida

Fatigue is recognized as a major symptom of cancer and cancer treatment, and has been shown to adversely affect quality of life. However, understanding of this symptom has been hampered by a lack of consensus regarding what constitutes cancer-related fatigue (CRF). The utility of a proposed Diagnostic Interview for a syndrome of CRF (DICRF) was assessed in 81 breast cancer (BC) patients. Women (mean age = 55.3; range 33-94) were interviewed after finishing their initial course of adjuvant therapy (chemotherapy (n=42) or radiotherapy (n=39)) for stage 0-II BC. Patients completed the DICRF and measures of fatigue (POMS, Fatigue Symptom Inventory (FSI)), depression (CES-D), fatigue catastrophizing (FCS), and a modified version of the SCID. Using the DICRF, 17% (n=19) met criteria for CRF. T-test analyses indicated that the CRF group reported symptoms of poorer sleep (84%), loss of interest in activities (79%), feeling more frustrated (58%), and struggling to accomplish tasks (95%) than women without CRF. The CRF group reported significantly more fatigue (POMS; $p<.01$), fatigue-related catastrophizing (FCS; $p<.01$), and on the FSI reported more current fatigue, higher average fatigue, more number of days and higher percent of day fatigued, more life interference from fatigue ($p's<.01$). Additionally, women in the CRF group reported more psychological distress (CES-D; $p<.01$), and were more likely to receive a diagnosis of current depression (SCID; $p<.05$). Results suggest the validity of the DICRF for identifying patients with CRF. Use of the DICRF to define "cases" of CRF has great potential to enhance research and clinical management related to CRF.

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E-39

EXPLORING RELIGIOUS SOCIAL SUPPORT AND BELIEFS/PRACTICES AMONG BREAST CANCER PATIENTS: ASSOCIATIONS WITH ADJUSTMENT

Allen C. Sherman, Ph.D., Stephanie Simonton, Ph.D., Umaira Latif, M.Sc., Joyce Fowler, M.S.W., and Karen Suen, R.N., University of Arkansas Medical Sciences

Despite growing interest in religiousness and adjustment to illness, few studies have differentiated among conceptually different dimensions of religious involvement. The SBI-15 is a recently developed measure that assesses 2 relevant dimensions: (1) spiritual beliefs and practices (BP) and (2) religious social support (SS). This paper reports an independent examination of its psychometric performance and associations with adjustment among breast cancer patients. Participants were 60 women with early stage disease. Median time since diagnosis was 4 months and average age was 55.0. Fifteen percent were African American and 83.3% were white; most (80%) were Protestant.

Internal consistency of each subscale was high (alpha= .88 for BP and .87 for SS). There was a moderately high correlation between the 2 subscales ($r= .68$, $p <.001$). As expected however, the SS subscale was more strongly tied to public religiousness (DUREL Organizational: $r=.52$, $p< .001$) than to private religiousness (DUREL Nonorganizational: $r= .25$, $p= .055$). Both subscales were moderately correlated with strength of religious faith (SCSRF: r's >.58) and intrinsic religiousness (DUREL Intrinsic: r's >.61). With respect to adjustment, SS was negatively associated with pessimism ($r= -.32$, $p< .05$), and positively correlated with optimism ($r= .38$, $p <.01$) and social/family well-being (FACIT, $r= .36$, $p< .01$). The BP was negatively associated with pessimism ($r= -.39$, $p< .01$). Neither subscale was associated with emotional distress (BSI, IES) or physical symptoms (FACIT). Results seem to support the value of examining different dimensions of religiousness among oncology patients.

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E-40

RELIGIOUS FAITH AND ADJUSTMENT TO BREAST CANCER

Allen C. Sherman, Ph.D., Umaira Latif, M.Sc., Stephanie Simonton, Ph.D., Joyce Fowler, M.S.W., Karen Suen, R.N., University of Arkansas Medical Sciences; and Thomas Plante, Ph.D., Santa Clara University

There has been heightened interest in whether religious involvement influences psychosocial adjustment to cancer. Although research in this area is improving, prior studies have tended to use idiosyncratic measures of religiousness, or have confused distinct constructs such as general religious orientation, cancer-related religious coping, and religious well-being. This study examined whether one dimension of general religiousness—strength of religious faith—is associated with adjustment to breast cancer. We examined baseline (i.e., pretreatment) data from 87 women enrolled in a group intervention study. Participants had recently-diagnosed stage 1-3A breast cancer. Fifteen percent were African American and 80% were white. Mean age was 53.4, and socioeconomic status varied widely.

Religious faith (SCSORF) was significantly associated with a range of positive indices, including active cognitive coping (Dealing with Illness Scale, $p< .00001$), active behavioral coping ($p< .05$), stress-related growth (SRG, $p< .01$), family communication about cancer (Openness of Discussion about Cancer in the Family, $p< .05$), optimism (LOT, $p<.05$), social support (SPS, $p< .05$), and social/family wellbeing (FACIT, $p< .05$), and was marginally associated with functional wellbeing (FACIT, $p< .10$). In multivariate analyses controlling for demographic factors, tumor stage, and psychiatric history, associations with active cognitive coping, active behavioral coping, family communication, and stress-related growth remained significant, with a trend for optimism. In contrast, religious faith was not associated with measures of emotional distress. Overall, religious faith appears to be more strongly tied to coping and posttraumatic growth rather than to negative affect or physical symptomatology in this population.

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PROCESS DIMENSIONS OF GROUP TREATMENT FOR BREAST CANCER PATIENTS

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Although group interventions for cancer patients have received considerable study, surprisingly little attention has focused on group process as opposed to group outcomes. This report presents findings from a group program for recently-diagnosed, early-stage breast cancer patients. Participants were randomized to routine care or a therapy group that convened weekly for 12 weeks, followed by monthly booster sessions. Eighty-nine women were enrolled, 12 of whom died or dropped out. Average age was 53.4; 15% were African-American and 80% were white. The groups focused on coping, support, emotional expression, and existential issues.

Group process was assessed at repeated intervals with the Group Climate Questionnaire. Overall, participants portrayed the groups as quite high on engagement (i.e., "group work"), low on conflict, and moderate on avoidance. Over the course of treatment, engagement increased ($p<.01$) while conflict diminished ($p<.05$), in a manner fairly consistent with a group development perspective. Several patient characteristics, assessed prior to treatment, were prospectively associated with group process. High levels of group engagement were reported by women who had demonstrated higher optimism (LOT, $p<.05$) and active behavioral coping (DWI, $p<.05$) and lower emotional distress (BSI, $p<.05$). Conversely, high levels of group avoidance were reported by women who had displayed limited communication about cancer (ODCF, $p=.055$), more avoidant stress symptoms (IES, $p=.057$), little coping self-efficacy(CBI, $p<.05$), and poor physical functioning (FACIT, $p<.01$). Contrary to hypotheses, process measures did not strongly predict short-term treatment outcomes. Findings have clinical implications, and demonstrate that group process research is feasible in medical populations.

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PSYCHOSOCIAL CONCERNS AND CLINICAL PROGRAM INTERESTS OF WOMEN AT A COMPREHENSIVE BREAST CARE CENTER

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National Comprehensive Cancer Network (NCCN) Guidelines propose that breast cancer (BC) patients' distress is most effectively managed when patients' concerns are carefully evaluated and clinical programs are targeted to patients' preferences. A questionnaire, based on NCCN standards and assessing patients' past and current concerns and interest in psychosocial programs, was completed by 173 women (77% response rate) at a comprehensive BC treatment facility. The questionnaire also assessed demographic and clinical information. Respondents (M = 51.06 years; range =18-84) were presenting for BC diagnostic procedures (39%), post-surgical follow-up (14%), adjuvant therapy (21%), or other (23%) appointments. Regarding current psychosocial concerns, 73% of respondents reported >1 types of Emotional Distress ("Worry" most frequent), 37% reported >1 types of Family Difficulties ("Concerns About Partner" most frequent), and 30% reported >1 Spiritual/Religious Concerns ("Difficulty Relating to God" most frequent). Regarding past concerns, women reported >1 concerns in the areas of Emotional Distress (31%), Family Difficulties (26%), and Spirituality/Religion (9%). Over half (58%) cited interest in >1 programs. Women were 2.5 times more likely to prefer individual rather than group format ($p < .05$). Clinical programs generating the most interest were: 1) cancer risk information (47%), 2) nutrition education (44%), 3) supportive counseling (37%), 4) relaxation (36%) and 5) wellness (35%). There were no differences in program interests by age or reason for appointment (p's > .05). Results provide valuable information that can be used to develop clinical and behavioral programs that take into account women's concerns and preferences throughout care and treatment for BC.

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DYADIC ADJUSTMENT MODERATES EFFECTS OF COPING IN COUPLES WITH PROSTATE CANCER

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Dyadic adjustment and coping styles have been shown to predict levels of psychological distress following a cancer diagnosis. The present study examines the relationship between coping and distress in couples faced with prostate cancer, considering dyadic functioning as a focal third variable that potentially moderates or mediates the relationship. To investigate the influence of dyadic strength on the success of patients' and spouses' coping efforts, both moderational and mediational statistical models were tested using couples' composite dyadic adjustment scores. 154 prostate cancer patients and their spouses completed the Dyadic Adjustment Scale, Impact of Events Scale, and Profile of Moods States. Participants were <19 months of diagnosis, ages 41-89, and ethnically-representative of the prostate cancer population in San Diego. A moderational model was supported for patients: dyadic strength moderated the effects of avoidant coping ($p<.0005$) and intrusive thinking ($p=.035$) on mood disturbance. Despite maladaptive coping regimens, patients that were members of stronger dyads reported less distress than those in more dysfunctional relationships. Conversely, patients with healthier coping styles but poor dyadic adjustment demonstrated more distress than others in more resilient relationships. Mediational models were not supported for patients or spouses. Significant main effects were detected for spouses; dyadic functioning predicted distress ($p<.0005$), avoidance ($p=.005$), intrusiveness ($p=.027$), and hyperarousal ($p=.001$). Findings suggest that the relationship between coping and distress depends on the quality of dyadic functioning for prostate cancer patients. Being part of a strong dyad may serve as a buffering factor, implying the need for psychosocial intervention on a dyadic level for couples with cancer.

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QUALITY OF LIFE (QOL) AND DIET IN BREAST CANCER

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The WHEL Study is a randomized trial of the effect of a major dietary change on breast cancer recurrence and overall survival in women with breast cancer. This analysis examined baseline associations between quintiles of women categorized by dietary pattern and eight scales from the RAND-36-Item Health Survey (Physical Functioning, Role Limitations-Physical, Pain, General Health, Emotional Well-being, Role Limitations-Emotional, Social Functioning, Energy/Fatigue). Score differences of 6.5 on the first four and 7.9 on the latter four scales are clinically meaningful. Analyses were run separately for women aged <55 (n=1543) and >=55 (n=786) using age, education, body mass, alcohol consumption, smoking, exercise as covariates. For younger women, only Role Limitations-Emotional demonstrated a clinically meaningful/statistically significant positive dose-response relationship: women with the highest-fiber/lowest-fat diet scored 9.4 points healthier than those with the lowest-fiber/highest-fat diet. For older women, only Role Limitations-Physical demonstrated a clinically meaningful/statistically significant relationship with dietary pattern—with a bell-shaped distribution: the middle quintile had the healthiest score—13.9 points healthier than the lowest-fiber/highest-fat quintile and 11.5 points healthier than the highest-fiber/lowest-fat quintile. In younger breast cancer survivors, role limitations due to emotional factors, perhaps the most important QOL limitation for this age, are related to how strongly they have implemented selected cancer-prevention guidelines. Among older women, both those who have the lowest-fiber/highest-fat diet as well as the highest-fiber/lowest-fat diet were more likely to have role limitations due to physical problems than women with average diets. More research is needed to understand this relationship in older women.

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IMPACT OF INTERNET HEALTH INFORMATION ON NEWLY DIAGNOSED CANCER PATIENTS

Sarah Bauerle Bass, Ph.D., M.P.H., Temple University, Fox Chase Cancer Center (FCCC); Linda Fleisher, M.P.H. (FCCC); and Nancy McKeown-Conn, M.B.E. (FCCC)

This presentation outlines the results of a study funded by the National Cancer Institute (NCI) (N=600) that surveyed eligible callers to the NCI's Atlantic Region Cancer Information Service (CIS) Telephone Service (1-800-4-CANCER). The research questions asked whether there were relationships between Internet use, to both patient behaviors with physicians, and perceived self-efficacy. Participants were newly diagnosed with cancer (within eight weeks of call), over 18 and had not yet begun cancer treatment. A follow-up phone survey was conducted 6 weeks after the initial call to the CIS. Measures included perceived behavior with physicians, the Cancer Behavior Inventory (Merluzzi & Nairn), which measures self-efficacy, and questions about computer/Internet usage. The study compared Direct users of Internet health information (those who accessed information themselves) with Indirect users (those who received Internet information from friends/family) and Non-users of Internet health information. Significant findings include a major shift in Internet user category, with over 25% of Indirect and Non-users utilizing Internet health information in some way. Direct users were found to ask significantly more questions of their physicians as well as make question lists and do outside research before a physician visit. There were significant relationships between Internet use and a number of self-efficacy measures, including maintaining independence - indicating that those using the Internet felt more confident in being able to deal with their illness. This is one of the first studies to attempt to associate Internet use with patient behavior change. Its findings have the potential to inform healthcare on the complex relationships between new technology and patient behavior.

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LONGITUDINAL ANALYSIS OF EXERCISE PATTERNS IN WOMEN RECEIVING ADJUVANT TREATMENT FOR BREAST CANCER

Abbie Beacham, Ph.D.*, Michael Andrykowski, Ph.D., Uzma Malik, M.D., University of Kentucky College of Medicine; and Paul Jacobsen, Ph.D., University of South Florida

Physical exercise has been regarded as beneficial during and after adjuvant treatment for breast cancer (BC). This study examined exercise patterns prospectively among women (N=114; M age=52.8; range=21-78) diagnosed with Stage 0, I or II BC. Women were undergoing adjuvant treatment [chemotherapy/radiation (CT+RT; n=54), radiation (RT; n=51) or chemotherapy (CT; n=8) alone]. Women completed the Godin Leisure Time Exercise Questionnaire (LTEQ) a measure of exercise frequency, duration and intensity (Strenuous/Moderate/Mild), at baseline (prior to adjuvant treatment), during adjuvant treatment, and 2-month post-treatment follow-up. Most women (64%) reported engaging regularly in some form of exercise during the 6-months prior to BC diagnosis (PreDx). Over half (62%) of PreDx "exercisers" and an additional seven PreDx "non-exercisers" reported engaging in exercise during adjuvant treatment. Frequency and duration of exercise did not differ by treatment group at baseline, completion of initial treatment (CT or RT), or 2-month follow-up. Differences were apparent for exercise intensity, however. Among women in the CT+RT group, t-test analyses indicated PreDx "exercisers" engaged in Mild ($p < .05$) or Moderate ($p < .05$) exercise more frequently during chemotherapy than PreDx "non-exercisers". PreDx "exercisers" receiving CT+RT, engaged in Moderate Intensity exercise for longer duration (minutes/session) than "non-exercisers" ($p < .05$). Differences between PreDx "exercisers" and "non-exercisers" were also evident at 2-month follow-up in Frequency ($p < .05$) and Duration ($p < .05$) of Strenuous exercise in the CT+RT group. Consistent with adherence-based models of exercise participation, exercise history is a strong predictor of maintenance or adoption of exercise activity during adjuvant treatment for BC.

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THE IMPACT OF CANCER ON ONE'S PERSPECTIVE ON LIFE: ACROSS THE LIFESPAN

Keith M. Bellizzi, M.A., University of Connecticut

A growing body of empirical research has suggested what many physicians have known for years, that is, in addition to the many individuals who report a reduction in psychological health in the aftermath of a diagnosis of cancer, there are also numerous individuals who experience positive psychological benefits in various aspects of their lives. Using a lifespan approach, the purpose of this study was to examine the impact that cancer has had on one's perspective on life. Three age-cohorts were examined (26-41, 42-54, 55 plus). Questionnaires were mailed to 400 randomly selected cancer survivors from a metropolitan hospital tumor registry. The final sample consisted of 81 participants ranging in age from 26 to 93 (M=53, SD=16.72; male=55%, female=45%). Results suggest that all three groups see themselves as having been impacted in a positive way by having had cancer. However, evidence also suggests a linear decline in impact for the middle and older groups compared with the younger group. A two-way contingency table analysis suggest significant gender differences with respect to the impact on one's perspective on life, Pearson Chi-Square (3, N=70)=9.066, p=.028. Interestingly, 12% of the sample that indicated that having cancer had no impact on their perspective on life reported that they were dealing with other problems, such as the recent loss of a loved one, hearing problems, and memory loss. Understanding these differences should provide researchers and clinicians with a lifespan appreciation of the influence that cancer can have on one's perspective on life and perhaps many other aspects of their lives.

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EXAMINING THE CONVERGENCE OF CONTROL PROCESSES AND SOCIAL COMPARISONS IN MIDLIFE AND OLDER ADULT CANCER SURVIVORS

Keith M. Bellizzi, M.A.*, Claudia E. Oakes, M.S., and Thomas O. Blank, Ph.D., University of Connecticut

Research suggests the use of social comparisons and control-related beliefs affect how individuals cope with both acute and chronic illness. However, little is known about the relationship between these two processes. Further, little is known of use of either in naturalistic descriptions of one's response to having a disease. The purpose of this research is to explore the interrelationships among control processes and social comparison processes as expressed in narrative form by midlife and older adult cancer survivors using an in-depth content analysis of 30 autobiographical books. The sample consisted of 21 males and 9 females ranging in age from 30 to 70 (M=54; SD=9.27). Of the 30 authors 55% had prostate cancer, 25% had breast cancer, and 20% had other classifications of cancer. Narrative expressions of control processes (being in control, loss of control, and desire for control) and social comparisons (upward, downward, and parallel) were coded and marked.

The results indicate that individuals who engaged in more directional comparisons (upward or downward) versus parallel comparisons expressed significantly more desire for control ($t=3.315$, $p=.003$), but there were no differences in expressions of loss of control or feelings of being in control. These data suggest that adult cancer survivors who engage in directional social comparisons for the purposes of self-evaluation or self-enhancement may be motivated to do so by desire for control over their situation. Findings are discussed with respect to understanding the multidimensional aspects of coping with cancer.

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BEHAVIORAL ISSUES CONCERNING THE USE OF SPIRAL CT FOR EARLY LUNG CANCER DETECTION

Pamela Bradley, M.Ed., Robert Schnoll, Ph.D., Suzanne Miller, Ph.D., Michael Unger, M.D., Jim Baab, Ph.D., and Mark Cornfeld, M.D., Fox Chase Cancer Center

Since spiral CT may soon be sanctioned for lung cancer screening, this study, with 165 current and former smokers, examined: 1) interest in, and awareness of, spiral CT for lung cancer screening; 2) correlates of interest in spiral CT; and 3) expected effects of screening on smoking. Our analyses show that: 1) 76% of respondents are unaware of this lung screening method; 2) after receiving information about the procedure, 43% of respondents express high interest in receiving a scan and 35% say that they will seek it; 3) greater intention to pursue screening is associated with being a current smoker, having a family history of lung cancer, reporting lung cancer-related symptoms (e.g., coughing, shortness of breath) and higher levels of: knowledge of asymptomatic illness (i.e., that disease can form before symptoms), perceived lung cancer risk, screening-related self-efficacy (e.g., I'm confident that I can undergo screening), the pros of screening (e.g., screening increases treatment options), and cancer-related emotional distress (e.g., I have anxiety about my lung cancer risk); and 4) 19% of smokers say that they would quit smoking if the scan is negative, 51% indicate that they would quit if the scan is positive, and 90% indicate that they are interested in smoking cessation counseling along with a scan. These findings can help guide the design of interventions to promote the use of spiral CT for early lung cancer detection.

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Paper Session #30 11:15 a.m.–11:30 a.m.

EXERCISE LAPSE IN THE FACE OF HIGH-RISK SITUATIONS: GENDER DIFFERENCES IN COGNITVE COPING AND IMPACT OF GUILT

Barbara Stetson, Ph.D., University of Louisville and Abbie Beacham, Ph.D., University of Kentucky

The Relapse Prevention Model (RPM) incorporates Coping Resources, Guilt and Perceived Control as predictive of behavior maintenance/lapse. Participants were regular exercisers including healthy men (n= 31, M age=38 years, range= 23-67) and women (n=46, M age= 36.46, range=22-77) who were asked questions regarding one specific self-described "high-risk" situation in which they were tempted to not exercise. Cognitive and/or behavioral coping responses were coded for type of strategies employed by exercisers when faced with the "high-risk" situation. In the high-risk scenario, nearly two-thirds of women missed planned exercise sessions versus only one-third of men [x2 (1,4.46) p<.05]. T-test analyses indicated that while on average men exercised longer per session (M minutes/session=70 versus 52; p<.01) and higher level of intensity (Rating of Perceived Exertion; p<.03) than women, they did not differ in characteristics of "high-risk" situation (e.g., location, social aspects, weather or time of day) or associated mood/affect. Multiple Regression analyses indicate that among men, Guilt related to missing planned exercise sessions (ß= –.634, p < .0001) along with use of Positive Cognitive Coping strategies (ß =.417, p <.01) predicted outcome in high-risk situations. Among women in the sample, use of Positive Coping strategies (ß =.847, p <.0001) alone was most predictive of outcome. Levels of Perceived Control did not predict exercise outcome in either gender. Although women rated Guilt higher than men in the sample (p< .05), Guilt was more predictive of outcome in men. Findings highlight the complexity of cognitive and affective response to exercise lapse.

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Paper Session #30 11:30 a.m.–11:45 a.m.

THE RELATIVE IMPORTANCE OF SELF-REPORTED PSYCHOLOGICAL, SOCIAL AND ENVIRONMENTAL INFLUENCES IN EXPLAINING LEISURE TIME PHYSICAL ACTIVITY

Nicola W Burton, M.Psych.(Clinical), Brian Oldenburg,* Ph.D., Gavin Turrell, Ph.D., Queensland University of Technology, Australia

This study is part of a research program aimed at understanding the patterning of psychological, social and environmental influences of leisure time physical activity (LTPA) across different socioeconomic groups. Data were obtained via a self-report survey mailed to a random sample from the electoral roll in Brisbane, Australia (N=5000). A 57% response rate was achieved (N=2532). The survey consisted of 190 items reflecting 7 predefined domains of corrrelates: activity experiences, health status, cognitions, social support, neighbourhood environment, benefits, and barriers. The independent contribution of each domain to LTPA variation LTPA was assessed in a backward elimination logistic regression model, individually removing each of the domains and adjusting for age, gender, living situation, and socioeconomic status. Sociodemographic variables and domains collectively accounted for 25% variation in LTPA (Cox and Snell pseudo-R Square), which is similar to other studies. Independently, domains accounted for 0.1-1% of LTPA variation, with the exception of cognitions that accounted for 4.5%. Domains of activity experiences, social support and cognitions were significantly positively associated with LTPA (p<0.001). Individuals in the highest quartile for activity experiences (OR 2.17, 95% CI, 141-3.34), social support (OR 2.26, 95%CI, 1.61-3.17) and cognitions (OR 8.56, 95% CI, 5.35-13.66) were more likely to report sufficient LTPA for health when compared to the lowest quartile. Results highlight the multi-factorial determinants of LTPA. There is a need for more direct and objective measures at the environmental-level; and more complex multi-level modelling and dynamic analytic strategies to inform 'up-stream', evidence-based intervention strategies.

This project was supported with funding from the National Heart Foundation of Australia.

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Paper Session #30 11:45 a.m.–12:00 noon

PHYSICAL ACTIVITY AND MEDICAL COSTS AMONG ADULTS WITH AND WITHOUT MENTAL DISORDERS

David R. Brown, Ph.D., Guijing Wang, Ph.D., and Marc A. Safran, M.D., F.A.C.P.M., Centers for Disease Control and Prevention

We hypothesized that physical activity is related to lower health care costs (and this benefit would be afforded people with and without mental disorders). Data sources are the 1995 National Health Interview Survey (NHIS) and 1996 Medical Expenditure Panel Survey (MEPS), a follow-up survey of a subset of NHIS respondents. NHIS physical activity data were available on 2,305 MEPS respondents (age >18; 41.4% Men, 58.6% Women). ICD-9-CM codes were used to define groups with (n=340; 14.9%) and without (1,965; 85.1%) diagnosed mental disorders. After excluding people with physical limitations (n=139), respondents were defined as active if they did leisure-time physical activity >5 times/week, >30 minutes/time at any intensity, or >3 times/week, >20 minutes/time at a large increase in heart rate/breathing (N=1,077). People doing less or no activity were considered sedentary (n=1,089). The prevalence of physical activity was 47.8% (44% among people with mental disorders; 49% without mental disorders). The average annual medical costs were $4,940 and $1,988 for sedentary and active groups, respectively, among people with mental disorders (difference = $2,952; p<0.05). The average annual medical costs were $2,446 and $1,981 for sedentary and active groups, respectively, among people without mental disorders (difference = $465; p< 0.15). Sedentary people incurred higher medical expenditures in each gender and age group (18-44; 45-64; 65+) except for people without mental disorders in the 18-44 age group. In conclusion, sedentary people were found to have higher average annual medical costs than people who are physically active, particularly among those with diagnosed mental disorders.

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Paper Session #31 10:30 a.m.–10:45 a.m.

EXERCISE ATTENUATES FATIGUE SEVERITY RATINGS IN WOMEN RECEIVING CHEMOTHERAPY FOR BREAST CANCER

Abbie Beacham, Ph.D.*, Michael Andrykowski, Ph.D., Uzma Malik, M.D., University of Kentucky College of Medicine; and Paul Jacobsen, Ph.D., University of South Florida

Exercise during and after adjuvant cancer treatment is thought to attenuate symptoms of fatigue. This study examines fatigue and exercise patterns prospectively in women receiving adjuvant treatment (chemotherapy–CT and/or radiation–RT) for Stage 0, I or II breast cancer (BC). Women (n=105, M age=53; range=21-78) completed measures of pre-diagnosis (PreDx) and current exercise (Godin Leisure Time Exercise Questionnaire; LTEQ) and peak fatigue severity (PFS) rating (scale 0-10) at baseline (pre-adjuvant treatment), completion of initial and final courses of adjuvant treatment, and 2-month post-treatment follow-up. At each assessment, women engaging in some exercise (Strenuous/Moderate/Mild) on the LTEQ were classified as "exercisers" versus "non-exercisers." T-test analyses showed that women who had engaged in regular exercise during 6-month PreDx period rated baseline PFS lower than those not engaging in PreDx exercise (M=3.07 versus 4.26; p<.05). Among women receiving CT+RT and CT only, exercisers reported lower PFS than non-exercisers during the week prior to conclusion of CT (M=5.13 versus 7.14; p< .05). Conversely, among women who received RT after CT completion, exercisers rated PFS higher than non-exercisers (M= 4.78 versus 2.5; p<.05) at completion of RT. Of women receiving RT only, PFS did not differ between exercisers and non-exercisers. Results suggest that during adjuvant CT, differences in PFS are reflected in comparisons of engaging in some exercise versus none. However, this trend was reversed as women receiving CT+RT approached RT completion. These differences did not emerge in items assessing average fatigue levels. This underscores the utility of multiple fatigue indices.

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Report

Adherence to recommendations for clinical follow-up after benign breast biopsy

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Key words: adherence, biopsy, breast cancer, clinical follow-up, compliance, psychosocial

Summary

Purpose. Women who undergo a benign breast biopsy are at elevated risk for the subsequent development of breast cancer (BC). Therefore, appropriate clinical follow-up of a benign breast biopsy is important. The present study examines the extent and correlates of nonadherence with follow-up recommendations after a benign breast biopsy.

Methods. Women ($n = 114$) who had undergone a benign breast biopsy completed an initial telephone interview within 50 days of their biopsy (mean = 21 days). Additional telephone interviews were completed at 4 and 8 months post-biopsy. Measures of BC risk perception, general and BC-specific distress, BC-related attitudes and beliefs, social support, optimism, and informational coping style were completed. Specific recommendations for clinical follow-up and evidence of actual follow-up were obtained from medical records.

Results. Of 103 women given a specific recommendation for clinical follow-up, 34% were classified as nonadherent with follow-up recommendations. Logistic regression analyses indicated that nonadherent women were characterized by younger age, recommendations for follow-up by clinical breast examination alone, greater confidence in their ability to perform breast self-examination properly, higher perceived personal risk for BC, and greater BC-specific distress.

Conclusion. Despite the importance of appropriate clinical follow-up of a benign breast biopsy, about one-third of women did not adhere to recommended follow-up. Risk factors for nonadherence suggest potential avenues for interventions to enhance participation in appropriate clinical follow-up.

Introduction

Early detection and diagnosis of female breast cancer is associated with significant reductions in disease-related mortality [1–4]. To facilitate early detection and diagnosis, women are advised and encouraged to participate, as appropriate, in routine breast cancer screening activities such as mammography and clinical breast examination (CBE).

While the potential benefits of breast cancer screening have been demonstrated, some drawbacks exist. It has been estimated that routine mammography screening for breast cancer yields an 'abnormal' result (i.e., suspicious or inconclusive) about 20% of the time [5, 6]. Additionally, CBE may yield an abnormal result, even when mammogram results are normal. The vast majority of these abnormal results are not indicative of a malignant lesion but rather stem from asymmetries in breast tissue or structure, benign cysts or masses, or greater mammographic density attributable to age or use of hormone replacement therapy in postmenopausal women [7]. Typically, such abnormal results are followed by a repeat mammogram or by recommendations for additional clinical follow-up

in 3–6 months. In some cases, however, an abnormal screening result requires performance of a biopsy procedure to distinguish malignant from benign breast disease. Diagnostic breast biopsy procedures include fine needle aspiration (FNA), core needle biopsy, or excisional breast biopsy. Approximately 20% of all diagnostic breast biopsy procedures produce a positive diagnosis of breast cancer. In the overwhelming majority of women the biopsy yields a diagnosis of benign breast disease.

Although a breast biopsy may not reveal a malignancy, some data suggests that women undergoing breast biopsy for benign breast disease are at elevated risk for subsequent development of breast cancer [8–12]. As a result, appropriate clinical follow-up of a benign breast biopsy is important. While consensus may not exist regarding what exactly constitutes appropriate clinical follow-up for these women, some combination of screening mammography and/or CBE within the ensuing 4–6 months is typically recommended.

Despite its potential significance no research has examined the extent of adherence to recommendations for clinical follow-up after a benign breast biopsy. Several lines of reasoning suggest that adherence in this setting might be less than optimal. First, it is well known that significant numbers of individuals fail to adhere to recommendations for participation in routine cancer screening activities [13–15]. Second, research in other cancer screening settings suggests that nonadherence to recommendations for clinical follow-up after being informed of an abnormal cancer screening result is common [16–21]. For example, it is estimated that up to 40% of women with an abnormal Papanicolau (Pap) test result fail to adhere to recommendations for follow-up biopsy or colposcopy [17]. Similarly, in a study of a large breast cancer screening program, 18% of women with abnormal mammogram results received inadequate follow-up [19]. Third, several studies have shown that the biopsy experience is associated with considerable anxiety. Significantly elevated levels of distress have been found in women either awaiting the biopsy procedure [22–27] or awaiting notification of biopsy results [28]. If persistent, such anxiety might interfere with a woman's motivation to adhere to follow-up recommendations [29]. Finally, some evidence suggests that the experience of benign breast biopsy might impact a woman's practice of other cancer screening behaviors [30, 31]. Specifically, Janz et al. [31] found that practice of BSE was altered following the experience of a benign breast biopsy. Women whose lump was detected during routine mammography were likely to increase BSE practice while women whose lump was self-discovered were likely to decrease BSE practice. Similarly, Haefner et al. [30] found that women who had practiced BSE regularly prior to experience of a benign biopsy were more likely to reduce their practice of BSE. Women who had not practiced BSE regularly prior to biopsy were more likely to increase their practice of BSE.

Thus, while the existing literature suggests that a benign breast biopsy can be a distressing experience for many women, the impact of the biopsy experience upon subsequent participation in cancer screening activities is unclear. In particular, the extent of nonadherence with recommendations for clinical follow-up is unknown. The purpose of the present study is to examine the extent of nonadherence to recommendations for clinical follow-up after a benign breast biopsy. In addition to documenting the extent of nonadherence, the present study seeks to identify demographic, clinical, and psychosocial variables associated with risk for nonadherence.

Patients and methods

Patients

Eligible women were identified in a consecutive series from the daily roster of patients seen at the University of Kentucky Comprehensive Breast Care Center. To be eligible for study participation, a woman must have met the following criteria: (a) $\geq$18 years of age; (b) scheduled to undergo or have recently undergone a breast biopsy or FNA for diagnostic purposes; (c) no prior history of breast biopsy or FNA; (d) receipt of benign results following their breast biopsy or FNA; (e) be able to read, write, and understand English; and (f) provide written informed consent for participation.

Using these criteria, 143 women were identified as study eligible during an 11-month period between December, 1996 and November, 1997. Of these, 129 (90%) provided written informed consent for study participation. Of the 14 women who declined study participation, most cited being 'too busy' or 'too stressed' as the reason. Seven women who consented to study participation were subsequently diagnosed with a breast malignancy and were thus ineligible for further study participation. Additionally, three women

failed to complete the initial telephone interview at all and five women did not complete the initial telephone interview within 50 days of their breast biopsy or FNA. These eight women were also dropped from the study. The final study sample, therefore, consisted of 114 women who completed the initial telephone interview within 50 days of study entry (84% of all study eligible women and 93% of eligible women consenting to participate). These women were a mean of 43.8 years of age (SD = 14.0; range = 19–84 years) at the time of the initial interview. They completed the initial telephone interview a mean of 21 days following their breast biopsy or FNA (SD = 9.9; range = 2–47). The majority of women in the study sample underwent a breast biopsy ($n = 70$; 61%), while the remainder underwent an FNA ($n = 37$; 33%) or underwent an FNA followed by breast biopsy ($n = 7$, 6%).

The majority of the study sample was Caucasian ($n = 96$; 84%). The remainder of the sample identified their race as either African American ($n = 15$; 13%) or 'other' ($n = 3$; 3%). The mean number of years of education completed was 13.7 (SD = 2.9; range = 6–20 years). Marital status was as follows: single, never married ($n = 13$; 11%), divorced or separated ($n = 17$; 15%), married ($n = 76$; 67%), widowed ($n = 5$; 4%), or cohabitating ($n = 3$; 3%). Annual household income was as follows: < $20,000 ($n = 43$; 38%), $20,000–$40,000 ($n = 22$; 19%), $40,000–$60,000 ($n = 18$; 26%), and > $60,000 ($n = 27$; 24%). Four women (3%) did not provide information regarding annual income. Health or medical insurance coverage was as follows: Medicare/Medicaid ($n = 22$; 19%); private third party insurance ($n = 28$, 25%); HMO or PPO ($n = 50$; 44%); no health or medical insurance ($n = 14$, 12%).

Twenty-three women (20%) had at least one first degree biological relative (FDR) with a history of breast cancer ($n = 19$ with one FDR and $n = 4$ with 2 FDR's). Mean relative risk for breast cancer [32] in the study sample was 3.00 (SD = 1.5; range = 1.4 to 10.1) while mean absolute lifetime risk for breast cancer [33] was 10.6% (SD = 5.0%; range = 2.7–34.2%).

Procedure

All study procedures were performed in accordance with current ethical standards for the responsible conduct of human research and were approved by the local institutional review board.

Study eligible women were identified in a consecutive series from the daily clinic roster of the University of Kentucky Comprehensive Breast Care Center. Prior to undergoing a benign breast biopsy or FNA, eligible women were introduced to the study by the physician managing her care. Women interested in study participation were then given a detailed explanation of the study by a member of the project research staff. Project research staff were not involved in the woman's medical care. Written informed consent for study participation was then obtained. Following receipt of biopsy or FNA results, women whose biopsy or FNA yielded benign findings were telephoned by a member of the project research staff and a time for the initial telephone interview scheduled. The initial telephone interview, conducted some time after the woman was notified of her biopsy results, required 20–40 minutes to complete. Additional follow-up telephone interviews were completed 4 and 8 months following a woman's biopsy or FNA procedure. Each of the follow-up interviews required 15–25 minutes to complete. Finally, 12 months following a woman's biopsy or FNA, information was abstracted from each participant's medical record including specific recommendations for clinical follow-up, actual participation in follow-up CBE or mammography, and number and nature of interval problems and clinic visits during the past 12 months following the benign biopsy or FNA procedure.

Assessment protocol

During the initial telephone interview, all women completed a set of questionnaires designed to assess: (a) demographic and breast cancer risk variables; (b) events surrounding the biopsy/FNA; (c) dispositional/personality variables; (d) general and breast cancer-specific distress; (e) current social support; (f) breast cancer-related attitudes, beliefs, and behaviors; and (g) subjective breast cancer risk. At the 4 and 8 month follow-up interviews, all women again completed portions 'd' and 'g' of the assessment protocol described above and were asked whether or not they had undergone CBE or mammography since their last study interview. If they had, they indicated where and when they had undergone these screening procedures. While all women participated in a total of three telephone interviews following receipt of their biopsy results (i.e., initial interview, 4 and 8 month follow-up interviews) the remainder of this report utilizes only the data obtained at the initial telephone interview.

Demographic and breast cancer risk variables

Demographic information obtained included current age, race, marital status, educational level, and annual household income. In addition, information regarding risk factors for breast cancer, including age at menarche, parity, prior history of breast biopsy, and number of FDR's with breast cancer, was obtained.

Events surrounding the biopsy/FNA

All women were asked how they were notified of their biopsy or FNA results (telephone, letter, in-person, nurse or MD), whether they were told anything about their personal risk for breast cancer (nothing vs. lower, the same, or higher than the typical woman), what type of medical insurance they possessed (private fee for service, HMO, public, or none) and how satisfied they were with the medical care they received during their biopsy/FNA experience. Satisfaction ratings were obtained on a 10-point Likert scale with one endpoint 'not at all satisfied' and the other endpoint 'completely satisfied'.

Dispositional variables

Specific measures included the short form of the Miller Behavioral Styles Scale (MBSS-SF; [34]), a measure of informational coping style, and the Life Orientation Test (LOT; [35]), a measure of dispositional optimism.

General and breast cancer-specific distress

These included the Profile of Mood States-short form (POMS-SF; [36]), a measure of current, general distress, the Center for Epidemiologic Studies Depression Scale (CESD; [37]), a measure of current depressive symptoms, and the Impact of Events Scale (IES; [38]), a measure of current intrusive ideation and avoidance regarding a specified stressor. In the present study, women were asked to respond to the IES with regard to the stressor 'the possibility that you will develop breast cancer in your lifetime'. As such, the IES served as a measure of breast-cancer specific distress.

Current social support

Women completed the Duke-UNC Functional Social Support questionnaire (DUKE-SSQ; [39]), a measure of affective social support.

Breast cancer-related attitudes and beliefs

Information regarding breast cancer-related attitudes and beliefs was obtained from all women. Women were queried regarding their confidence in their ability to practice BSE correctly (four response options ranging from 'not at all' to 'definitely'), anxiety experienced while performing BSE (four response options ranging from 'none' to 'definite'), and anxiety about the results of future mammograms (four response options ranging from 'not at all' to 'a lot') and whether they would like to be taught how to better perform BSE (yes vs. no). Additional questions used in previous research included whether a woman could have breast cancer without having symptoms or feeling ill (yes vs. no), whether mammograms can find breast cancer early, and whether breast cancer can be cured if found early (four response options for both items ranging from strongly disagree to strongly agree) [40, 41].

Subjective breast cancer risk

Two subjective estimates of lifetime risk for breast cancer were obtained. Women provided an estimate of perceived personal lifetime risk for breast cancer by providing a percentage between 0 and 100% in response to the question 'What are the chances that you will develop breast cancer some day?' (personal BC risk). Second, women provided an estimate of typical lifetime risk for breast cancer by providing a percentage between 0 and 100% in response to the question 'What are the chances that the average woman your age will develop breast cancer some day?' (typical BC risk).

Objective breast cancer risk

Two objective estimates of lifetime risk for breast cancer were computed. For each woman, information regarding age, age at menarche, parity, prior history of breast biopsy (none in all cases here), and number of FDR's with breast cancer was obtained. Using established algorithms, this information was used to estimate both relative [32] and lifetime [33] risk for breast cancer.

Categorization of adherence/nonadherence with follow-up recommendations

Each woman's adherence with clinical recommendations for follow-up CBE was classified into one of three categories: adherent, nonadherent, or not applicable. Adherence with recommendations for follow-up mammography was also classified as adherent, nonadherent or not applicable. The 'not applicable' category was used when no evidence of recommendations for

follow-up CBE or mammography was found in the woman's medical record. Otherwise, a woman was categorized as either 'adherent' or 'nonadherent' with follow-up recommendations based upon comparison of recommendations for follow-up CBE or mammography found in her medical record to evidence of participation in CBE or mammography during the 12 months following benign biopsy or FNA, also found in her medical record. Specifically, if a recommendation for mammography was found in the medical record, a woman was categorized as adherent with mammography recommendations if the medical record also contained evidence of participation in mammography during the 12 months following benign biopsy or FNA. If a recommendation for mammography was found in the medical record, but her medical record contained no evidence of participation in follow-up mammography during the ensuing 12 months, a woman was tentatively categorized as nonadherent. For women tentatively categorized as nonadherent, responses to questions from the 4 and 8 month follow-up telephone interviews regarding recent participation in mammography were examined. If a woman reported during the follow-up interviews that she had not participated in follow-up mammography since her biopsy or FNA procedure she received a final categorization as nonadherent. Otherwise, if the woman indicated during the follow-up telephone interviews that she had recently participated in follow-up mammography, either at the University of Kentucky Comprehensive Breast Care Center or at a different clinic facility, she automatically received a final categorization of adherent with follow-up mammography recommendations. For women receiving a recommendation for follow-up CBE, identical procedures were employed to categorize them as either adherent or nonadherent with follow-up CBE recommendations. Based upon these separate classifications of adherence with recommendations for mammography and CBE, an overall classification of adherent or nonadherent with follow-up recommendations was then made. Women classified as nonadherent with either CBE or mammography recommendations (or both) were classified as nonadherent. All remaining women were classified as adherent.

Concordance between women's self-reports of participation in CBE and mammography following the biopsy or FNA procedure and actual clinic records was quite high. With regard to CBE, women's self reports obtained during the 4 and 8 month follow-up interviews were in complete agreement with clinic records for 95% of women. For only four women, self report of participation in CBE was not supported by documentation in her medical record. All of these women indicated that they had undergone CBE at another clinic facility (these women were categorized as adherent; see above). With regard to mammography, women's self reports were also in complete agreement with clinic records for 95% of women. No woman reported participation in mammography which was not documented in the medical record. However, three women failed to report participation in follow-up mammography which was documented in their clinic record (these women were categorized as adherent; see above). Finally, it should be noted that several ($n = 3$) women who were classified as adherent with follow-up recommendations participated in CBE or mammography but not during the clinically recommended time frame. Specifically, several women given recommendations for follow-up CBE and mammography in 6 months actually underwent follow-up 8–10 months following their benign biopsy or FNA. Rather than classifying these women as nonadherent, these three women were given the benefit of the doubt and were classified as adherent.

Statistical analyses

Total scores were computed for the LOT, POMS, CESD, IES, and DUKE-SSQ using standard scoring procedures. Subscale scores on the POMS and the MBSS-SF were also computed using standard scoring procedures. Univariate differences between women categorized as adherent or nonadherent with clinical follow-up recommendations were analyzed using *t*-test analyses for continuous and by chi-square analyses for categorical variables. All chi-square analyses employed Yates correction for continuity. Multivariate differences between adherent and nonadherent women were analyzed using logistic regression. To facilitate interpretation of the resulting odds ratios, all continuous predictor variables representing measures of either distress or social support (i.e., POMS-total, IES-total, CESD, DUKE-SSQ) were dichotomized at the 75th percentile of the distribution of scores in the present sample. An alpha value of 0.05 was employed as the criterion for statistical significance in all analyses.

Results

Women were notified of the results of their biopsy/FNA procedure in several different ways. Most

women reported they were notified of their results by the surgeon who performed the procedure either face-to-face (46% of sample) or over the telephone (23%). Other women reported they were notified of their results by the breast center nurse coordinator either face-to-face (2%) or over the telephone (26%). The remaining 3% of the sample reported that they received notification of their biopsy results via a letter from either their surgeon or the breast center nurse coordinator. Most women (89%) reported that at the time they were notified of their biopsy results, no additional information or discussion was provided regarding their personal risk for breast cancer. The remaining women reported that they were told that their personal risk for breast cancer was 'higher than average' (7%), 'average' (2%), or 'lower than average' (2%). In general, women were quite satisfied with the care they received before, during, and after their breast biopsy procedure. The mean satisfaction score was 9.1 (SD = 1.7; range 2–10) with nearly two-thirds of the sample ($n = 75$; 66%) reporting the maximum score of 10. Only six women (5%) reported a satisfaction score ≤ 5.

Types of follow-up recommendations and prevalence of adherence/nonadherence

Among the 114 women in the study sample, 11 women (10%) were not given any specific recommendation for clinic follow-up. Rather, they were instructed to continue monthly practice of BSE and to call the breast center if any problems developed. All of these women were under the age of 40 years and most had received a biopsy result indicating a fibroadenoma or an intraductal papilloma. The remaining 103 women (90%) were given some recommendation for clinical follow-up, but the specific nature of this recommendation varied. In general, clinic follow-up recommendations were of two types: recommendations for CBE alone ($n = 31$) or recommendations for both CBE and mammography ($n = 72$) (see Table 1). Of the 72 women advised to return for both CBE and mammography, 63 women (88% of women with recommendations for CBE and mammography) were asked to return in 6 months for both CBE and mammography. Seven women were asked to return for both CBE and mammography in either 3 months ($n = 5$; 7%), 4 months ($n = 1$; 1%) or 12 months (n=1; 1%). Finally, two women (3%) were given recommendations for CBE within 2 or 3 months followed by mammography in 9 or 6 months, respectively. Of the 31 women advised to return for CBE alone, 18 (58% of women with recommendations for CBE alone) were asked to return in 3 months. Of the remaining 13 women who received recommendations for CBE alone, five (16%) were asked to return for CBE in 6 months while eight women (26%) were asked to return for CBE in a specific time period ranging from 3 weeks to 2 months.

Table 1 shows the percentage of women who were categorized as adherent or nonadherent as a function of type of follow-up recommendation provided. Of the 103 women given some recommendation for clinical follow-up, 66% ($n = 68$) were categorized as adherent with their follow-up recommendations. The remaining 34% ($n = 35$) were classified as nonadherent with follow-up recommendations. These two groups served as our criterion groups of adherent and nonadherent study participants in subsequent analyses.

Univariate prediction of nonadherence with clinical follow-up recommendations

To identify univariate predictors of nonadherence with clinical follow-up recommendations a series of t-tests comparing the adherent ($n = 68$) and nonadherent ($n = 35$) groups were performed. Dependent variables included age, number of years of education, and satisfaction with medical care provided at the time of biopsy/FNA, as well as a variety of psychosocial, dispositional, and breast cancer risk variables assessed during the initial interview. Specific psychosocial variables employed as dependent variables in the analyses included current depressive symptoms (CESD total score), current mood disturbance (POMS total and subscale scores), breast cancer-related intrusive ideation and avoidance (IES total and subscale scores), BC-specific anxiety (BC-WORRY), and social support (DUKE-UNC total score). Dispositional variables included optimism (LOT) and monitor and blunter subscale scores from the MBSS-SF. BC risk variables included both objective (lifetime BC risk, relative risk) and subjective estimates (BC risk-personal, BC risk-typical). Results of these t-test analyses are shown in Table 2. In these univariate analyses, women categorized as nonadherent with follow-up recommendations were younger ($t = 4.78$; $p < 0.001$) and reported more depressive symptoms (CESD)($t = 4.78$; $p < 0.05$), greater overall mood disturbance (POMS-total)($t = 2.41$; $p < 0.05$), greater depression ($t = 2.82$; $p < 0.01$), anger ($t = 2.34$; $p < 0.05$), and confusion ($t = 2.20$; $p < 0.05$) on the POMS, and higher BC-WORRY scores ($t = 2.40$;

Table 1. Adherence/nonadherence with clinic follow-up recommendations as a function of type of recommendation(s)

Type of follow-up recommendation(s)	Total no	No of adherent[a] (%)	No of nonadherent[a] (%)
No clinic follow-up; continue BSE	11	–	–
Clinic follow-up: CBE only	31	13 (42)	18 (58)
Mammography only	0	–	–
Clinic follow-up: mammography +CBE	72	57 (76)	17 (24)[b]
Any clinic follow-up recommended[c]	103	68 (66)	35 (34)

Note: $n = 114$ in entire study sample.
[a]Number in parentheses indicates percentage of women in that category row adherent or nonadherent.
[b]Includes one woman who was adherent with recommendation for mammography but was nonadherent with recommendation for CBE.
[c]Includes women given recommendations for CBE only ($n = 31$) or Mammography + CBE ($n = 72$).

Table 2. *T*-test comparison of women adherent ($n = 68$) or nonadherent ($n = 35$) with recommendations for clinical follow-up

Variable	Adherent		Nonadherent		*p*-value[a]
	Mean	SD	Mean	SD	
Age	49.6	12.5	37.3	12.0	0.001***
No of Years education	13.9	3.0	12.9	2.8	0.130
CESD-total	10.1	9.5	15.6	13.3	0.016*
POMS scores					
Total	40.3	23.6	53.5	31.2	0.018*
Depression	4.2	5.4	8.1	8.3	0.006**
Tension	7.7	6.0	10.2	6.9	0.058
Confusion	4.2	4.1	6.2	4.7	0.030*
Anger	5.1	5.7	8.2	7.3	0.021*
Fatigue	7.8	5.5	9.1	5.8	0.245
Vigor	12.8	6.0	12.3	5.2	0.682
IES scores					
Total	15.5	14.6	25.7	17.4	0.002**
Avoidance	8.7	8.6	14.8	9.5	0.001***
Intrusion	6.9	7.5	11.0	9.3	0.017*
BC-WORRY	1.1	1.0	1.7	1.4	0.018*
LOT-optimism	30.2	4.3	30.4	5.4	0.843
MBSS-SF-monitor	4.9	1.7	5.3	1.5	0.213
MBSS-SF-blunter	2.9	1.4	3.1	1.3	0.536
SS-DUKE-UNC	33.9	5.6	31.9	6.6	0.124
Satisfaction with care	9.3	1.4	8.7	2.1	0.115
BC-risk estimates					
Objective lifetime risk	9.4	4.7	12.0	5.5	0.014*
Relative risk	2.9	1.5	3.3	1.8	0.266
BC risk-personal	28.1	23.1	42.8	27.9	0.006**
BC risk-typical	34.8	19.7	38.7	21.7	0.368

[a]Probability associated with *t*-value from independent samples *t*-test; two-tailed test of significance.
*$p < 0.05$; **$p < 0.01$; ***$p < 0.001$.

$p < 0.05$). Women categorized as nonadherent also reported more BC-related avoidance and intrusive ideation, as evidenced by higher total scores ($t = 3.15$; $p < 0.01$) on the IES as well as higher scores on the IES intrusion ($t = 2.42$; $p < 0.05$) and avoidance ($t = 3.30$; $p < 0.001$) subscales. Finally, nonadherent women evidenced both a greater objective lifetime risk for BC [33], as calculated from specific breast cancer risk factor information provided by each woman ($t = 2.50$; $p < 0.05$), and reported a higher subjective estimate of lifetime risk for BC (BC risk-personal) ($t = 2.83$; $p < 0.01$).

Differences between the adherent and nonadherent groups on categorical variables were examined in a set of chi-square analyses. Dependent variables included race (Caucasian vs. non-Caucasian) annual household income (< \$20K, \$20-50K, > \$50K), whether the woman had a spouse or regular partner (yes vs. no), medical insurance coverage (any vs. none), type of diagnostic procedure performed (biopsy vs. FNA), how the woman had been notified of diagnostic test results (telephone/letter vs. in-person), the specific type of follow-up recommendation given (CBE alone vs. CBE plus mammography), whether the woman had a FDR with a history of BC (yes vs. no), anxiety during BSE performance (none/little vs. some/definite), confidence in BSE performance (none/little vs. fair/definite), anxiety over future mammograms (none/little vs. some/lot), and belief that mammography can accurately detect BC (agree vs. disagree). Results of these analyses are shown in Table 3. Significant differences between the adherent and nonadherent groups were evident with regard to annual household income (X^2 (2) = 11.45; $p < 0.01$), type of follow-up recommendation given (X^2 (1) = 9.98; $p < 0.01$), confidence in the ability to perform BSE correctly (X^2(1) = 9.67; $p < 0.01$), and beliefs in the ability of mammography to detect breast cancer early (X^2 (1) = 4.78; $p < 0.05$). Specifically, women with lower annual household incomes, greater confidence in their ability to perform BSE correctly, less confidence in the ability of mammography to detect breast cancer early, and recommendations for follow-up CBE only were less likely to adhere to recommendations for clinical follow-up.

Multivariate prediction of nonadherence with clinical follow-up recommendations

A logistic regression analysis was performed in order to identify multivariate predictors of nonadherence with clinical follow-up recommendations. Variables were eligible for inclusion in an initial logistic regression model if their associated p-value in the univariate analyses (Tables 2 and 3) was ≤ 0.15. The entire set of eligible variables was initially entered simultaneously as a single block. Individual variables were then removed in a stepwise fashion in order to arrive at an optimal regression model. Criteria for removal from the model was set at 0.05. Individual variables included in the original model were age (< 50 years vs. $\geq$ 50 years), income (< \$20K vs. > \$20K), education ($\leq$ 12 years of education vs. > 12 years) confidence in the ability to perform BSE correctly (none/little vs. fair/definite), belief in the ability of mammography to detect breast cancer early (strongly/somewhat agree vs. strongly/somewhat disagree), type of diagnostic procedure performed (biopsy vs. FNA), type of follow-up recommended (CBE vs. CBE plus mammography), worry about breast cancer (not at all/rarely/sometimes vs. often/all of the time), perceptions of personal lifetime BC risk (< 50% vs. $\geq$ 50%), and objective lifetime BC risk (< 12.5% vs. $\geq$ 12.5%). Total scores on the POMS and IES were dichotomized at the 75th percentile (i.e., 25% most distressed women vs. 75% least distressed), while total scores on the DUKE-SSQ were dichotomized at the 25th percentile (i.e., 25% with least social support vs. 75% with most social support). Finally, ratings of satisfaction with biopsy/FNA care were dichotomized at the 25th percentile (25% least satisfied vs. 75% most satisfied).

Results of the logistic regression analysis are shown in Table 4. The entire 15-variable model was able to significantly predict whether or not women were nonadherent with recommendations for clinical follow-up (model X^2 (15) = 51.90; $p < 0.0001$). The 15-variable model resulted in accurate classification of 82.7% of the sample (88.9% of adherent women and 71.4% of nonadherent women). Significant variables in the 15-variable model included confidence in the ability to perform BSE correctly (odds ratio = 2.82; $p < 0.05$), age (odds ratio = 0.1386; $p < 0.05$), and type of follow-up recommendation given (odds ratio = 11.38; $p < 0.05$). Perception of personal lifetime BC risk was marginally significant (odds ratio = 3.5; $p < 0.07$). Specifically, risk for nonadherence with clinical follow-up recommendations was higher in women who professed confidence in their ability to perform BSE correctly, who indicated their personal lifetime risk for BC equaled or exceeded 50%, who were given follow-up recommendations that

Table 3. Chi-square comparison of women adherent ($n = 68$) or nonadherent ($n = 35$) with recommendations for clinical follow-up

Variable	Adherent		Nonadherent		p-value[a]
	No	Percentage	No	Percentage	
Annual household income					0.003**
< $20K	20	49	21	51	
$20–50K	19	66	10	34	
> $50K	27	87	4	13	
Current spouse/partner					0.182
Yes	50	70	21	30	
No	18	56	14	44	
Medical insurance coverage					0.536
Any	61	67	30	33	
None	7	58	5	42	
Race					0.265
Non-Caucasian	9	53	8	47	
Caucasian	59	69	27	31	
Type of diagnostic procedure[b]					0.076
Biopsy	50	72	19	28	
FNA	18	53	16	47	
Type of follow-up recommendation					0.001***
CBE only	13	42	18	58	
CBE + mammography	55	76	17	24	
Test result notification					1.00
Telephone/letter	37	67	18	33	
In-person	31	66	16	34	
FDR With BC					0.27
Yes	13	59	9	41	
No	55	68	26	32	
Anxiety during BSE					1.00
None/little	48	65	26	35	
Some/definite	14	67	7	33	
Confidence in BSE					0.002**
None/little	27	90	3	10	
Fair/definite	40	56	32	44	
Anxiety over future mammograms					1.00
None/little	33	66	17	34	
Some/a lot	35	66	18	34	
Mammography can detect BC					0.029*
Strongly/somewhat agree	67	69	30	31	
Strongly/somewhat disagree	1	16	5	84	

[a]Probability associated with X^2 statistic. All 2×2 chi-square analyses employ Yates' correction for continuity.
[b]Women receiving both biopsy and FNA procedures ($n = 7$) classified in the biopsy group.
*$p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$.

Table 4. Logistic regression analysis of nonadherence with clinical follow-up recommendations

Variable	Entire model			Best-fit model		
	OR[a]	95% CI[b]	*p*-value[c]	OR	95% CI	*p*-value
Age	0.14	0.02–0.90	0.04	0.18	0.04–0.79	0.023
Type of follow-up	11.38	1.01–127.73	0.05	5.95	1.79–19.74	0.003
Subjective BC risk	3.53	0.94–13.30	0.06	4.29	1.36–13.53	0.013
Confidence in BSE ability	2.83	1.18–6.80	0.02	2.46	1.22–4.98	0.012
IES-total	2.85	0.66–12.31	0.16	4.03	1.16–14.01	0.029
Income	0.42	0.09–1.93	0.27			
Education	2.04	0.47–8.78	0.34			
Type of procedure	2.53	0.26–24.27	0.42			
Satisfaction with care	0.91	0.21–3.98	0.90			
Objective BC risk	0.40	0.10–1.67	0.21			
Mammography Efficacy	7.77	0.39–156.21	0.18			
POMS-total	1.35	0.24–7.48	0.73			
CESD	0.98	0.13–7.16	0.98			
DUKE-SSQ	0.65	0.12–3.43	0.61			
BC WORRY	4.04	0.67–24.58	0.13			

[a]Odds ratio.
[b]Confidence interval.
[c]*p*-value associated with test of significance for OR.
Note: Variables coded as follows: age (<50 years (1); ≥50 years (2)); type of follow-up (CBE plus mammography (1); CBE only (2)); subjective BC risk (<50% (1); ≥50% (2)); confidence in BSE ability (none/little (1); fair/definite (2)); IES-total (<30 (1); ≥30 (2)); income (< $20K (1); ≥ $20K (2)); education (≤12 years (1); >12 years (2)); type of procedure (biopsy (1); FNA (2)); satisfaction with care (≤8 (1); >8 (2)); objective BC risk (<12.5% (1); ≥12.5% (2)); mammography efficacy (strongly/somewhat agree (1); strongly/somewhat disagree (2)); POMS-total (≤60 (1); >60 (2)); CESD (≤17 (1); >17 (2)); DUKE-SSQ (≤29 (1); >29 (2)); BC WORRY (not at all/rarely/sometimes (1); often/all the time (2)).

involved CBE only, and who were less than 50 years of age.

Stepwise removal of variables from the 15-variable model yielded a best fit model that contained five variables and allowed for significant categorization of women as adherent or nonadherent with follow-up recommendations (X^2 (5) = 41.53; $p < 0.0001$). The five-variable best fit model resulted in accurate classification of 78.6% of the sample (87.3% of adherent women and 62.9% of nonadherent women). The five variables retained in the best fit model included confidence in the ability to perform BSE correctly (OR = 2.46; $p < 0.05$), perceptions of personal lifetime BC risk (OR = 4.29; $p < 0.05$), total score on the IES (OR = 4.03; $p < 0.05$), age (OR = 0.18; $p < 0.05$), and type of follow-up recommendation given (OR = 5.95; $p < 0.01$). Specifically, risk for nonadherence with clinical follow-up recommendations was higher in women who professed confidence in their ability to perform BSE correctly, who indicated their personal lifetime risk for BC equaled or exceeded 50%, who were given follow-up recommendations that involved CBE only, who were less than 50 years of age, and who were among the 25% most distressed women on the basis of IES total scores.

Discussion

Appropriate clinical follow-up of women who have experienced a benign breast biopsy is important. While performance of the biopsy procedure itself does not directly confer additional risk, benign breast disease and a history of previous biopsy is associated with some elevated lifetime risk for BC [8–12]. While the degree of risk appears to vary as a function of histopathological features of the biopsy specimen as well as perhaps other clinical and demographic factors such as a woman's age [9], menopausal status [11], family history of breast cancer [10], or HER-2/*neu* status [42], it is not unreasonable to counsel (and expect) all women undergoing diagnostic breast biopsy to be particularly vigilant with regard to appropriate breast cancer screening [8]. Reflecting the lack of consensus in this area, women in our sample varied with regard

to specific recommendations for clinical follow-up of their benign breast biopsy. However, regardless of the nature of the specific recommendation a woman was given, we believe the fact that one third of our sample did not undergo their recommended clinical follow-up is a significant concern.

Given that nonadherence occurred in a significant proportion of our sample, the questions of 'which women' and 'why' assume critical importance. Results of our regression analyses (Table 4) suggest some answers with regard to the 'which women' question. In the present study, women classified as nonadherent with follow-up recommendations were more likely to be younger and to have received follow-up recommendations involving a return for CBE only. They were also more likely to report elevated perceptions of personal lifetime risk for BC, more confidence in their ability to perform BSE correctly, and higher levels of avoidance and intrusive ideation regarding their lifetime risk for BC at the initial interview, a mean of 3 weeks post-biopsy. In fact, using these five variables alone, we were able to correctly identify 87.3% (55/63) of the adherent women and 62.9% (22/35) of nonadherent women. Importantly, the specific type of diagnostic procedure performed (biopsy vs. FNA) was not associated with the likelihood of adherence with clinical follow-up recommendations either in the univariate (Table 3) or multivariate analyses (Table 4).

In the absence of more in-depth information, answers to the 'why' question should be viewed as speculative. Women may be less likely to adhere with recommendations for CBE follow-up alone, as opposed to recommendations for CBE plus mammography, because the absence of recommendations for concurrent mammography may diminish perceptions of the perceived importance of follow-up. Women who report greater confidence in their ability to perform BSE correctly may be less likely to adhere with follow-up recommendations because they view their effective practice of BSE as supplanting the necessity for clinical follow-up. While some anxiety can be a motivating factor with regard to performance of appropriate health protective behaviors, excessive anxiety can result in fear and avoidance of appropriate protective behavior [29, 41, 43–47]. This may account for the higher likelihood of nonadherence in women reporting more frequent avoidance and intrusive ideation regarding their risk for developing BC. A similar process may underlie our perhaps counterintuitive finding that perceptions of higher lifetime BC risk were linked to a reduced likelihood of adherence with follow-up recommendations. It is often taken for granted that a perception that one is at greater risk for a disease is likely to motivate appropriate health protective behavior. However, elevated perceptions of risk may result in fear and avoidance, particularly when it is believed that protective behaviors are not available or difficult to execute [48, 49]. Finally, younger women may be less likely to adhere with follow-up recommendations for several reasons. As breast cancer risk increases with age, younger women may perceive their risk for developing BC in the near future as minimal, thus reducing the perceived importance of participating in appropriate clinical follow-up of their biopsy. Additionally, the American Cancer Society advocates routine screening mammography for most women beginning at age 40 [50] while the National Institutes of Health does not advocate routine screening mammography until age 50 [51]. As a result, most women under the age of 40 and many women under the age of 50 are likely to have little experience with mammography and CBE. This may impact upon adherence to clinic follow-up recommendations in the biopsy setting in two ways. First, women in their 30's and 40's may perceive follow-up recommendations for CBE and/or mammography as inconsistent with these routine screening guidelines and thus less important for them. Second, the anxiety often associated with the biopsy experience [21, 23–28] may motivate women to avoid future cancer screening. This effect might be particularly likely in younger women with little established history of participation in routine breast cancer screening.

Given the importance of appropriate clinical follow-up after a benign breast biopsy, a critical question is whether and how adherence with clinical follow-up recommendations can be enhanced. Drawing upon previous research in similar settings, a variety of potential intervention options are available [18, 52–59]. These options range in cost, with cost broadly viewed in terms of effort as well as personnel and monetary expense necessary for implementation. At the low cost end of the spectrum are interventions which entail simple provision of written information. For example, in a randomized trial of women receiving abnormal mammogram results, Lerman et al., found that mailing psychoeducational materials prior to the recommended 1-year mammography follow-up resulted in an increase in the proportion of women receiving the recommended mammogram (66% adherence rate vs. 53% adherence rate in control women) [55]. At the higher cost end of the spec-

trum might be interventions which entail group or individualized counseling and education. The focus of intervention here would be management and reduction of any psychological distress associated with the biopsy experience or anticipation of future BC screening, development of appropriate perceptions of personal BC risk, and clarification of specific steps that can be taken to reduce BC risk or enhance early detection of BC. Psychoeducational interventions incorporating some or all of these or similar elements have been implemented with a variety of high risk cancer populations. These include women receiving recommendations for colposcopy follow-up after an abnormal cervical cancer screening result [18, 57], as well as women with a family history of breast cancer [52–54, 59]. While results have generally been promising, they have not been uniformly positive. Schwartz et al., found that individualized breast cancer risk counseling resulted in reduced mammography use among less-educated women, suggesting the need for careful evaluation of intervention efforts [60].

Our findings regarding characteristics of women most likely to be nonadherent can play an important role in efforts to enhance adherence with recommendations for clinical follow-up after benign breast biopsy. On the one hand, our findings suggest characteristics that could be considered in targeting intervention efforts toward women most likely to be nonadherent. This is particularly helpful in situations where resources to intervene with all women are lacking. While perfect prediction of nonadherent women is not possible at the present time, our findings could allow some narrowing of the entire pool of women undergoing benign breast biopsy by identification of those most at risk for nonadherence (or alternatively identification of those most likely to be adherent). On the other hand, our findings could be used to construct the intervention itself. Specifically, our findings suggest cognitive and affective factors or processes that may account for the failure to adhere with follow-up recommendations. For example, we might tentatively suggest that a successful intervention in the biopsy setting might include content elements designed to address the affective response to the biopsy experience, foster appropriate perceptions of BC risk, identify the limits of BSE alone as a BC screening tool, and reinforce the importance of biopsy follow-up in younger women.

To our knowledge, the present study constitutes an initial investigation into the prevalence and predictors of adherence with clinical follow-up recommendations after benign breast biopsy. Further research is clearly warranted to confirm and extend our findings. Further research in this area should also be mindful of the limitations of the present study, notably its relatively small sample size recruited from a single clinic facility, lack of specific *a priori* hypotheses, and the lack of a pre-biopsy assessment. In the present study, the initial study interview occurred following receipt of biopsy results. It is certainly possible that a pre-biopsy assessment might yield a different set of variables that distinguish adherent from nonadherent women. However, this does not diminish the significance of our finding that these two groups can be significantly differentiated on the basis of response to the benign biopsy experience assessed during the first month or so following notification of biopsy results.

In conclusion, despite the importance of appropriate clinical follow-up after a benign breast biopsy, we found that slightly over one-third of our sample failed to undergo recommended follow-up. While the precise reasons for this are not known at the present time, our findings regarding demographic and clinical characteristics associated with nonadherence allow some speculation in this regard. This information could be used to identify women who might be appropriate targets for interventions to increase follow-up adherence. This information could also be used to identify critical content elements to be incorporated into any intervention. While undergoing a benign breast biopsy may be alarming to many women, the experience might have salutary effects as well. Indeed, the biopsy experience might constitute a 'teachable moment' [61–63], an excellent opportunity for women to learn about effective breast cancer prevention and detection behavior, in particular, but also about appropriate cancer prevention and detection behaviors, in general.

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COMMUNICATION IN THE CANCER 'BAD NEWS' CONSULTATION: PATIENT PERCEPTIONS AND PSYCHOLOGICAL ADJUSTMENT

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SUMMARY

The purpose of this study was to explore relationships between breast cancer survivors' experiences during the diagnostic consultation and their subsequent long-term psychological adjustment. Sixty women (*M* age = 53 years) who had been diagnosed with local or regional breast cancer (Stage 0–IIIA) an average of 28 months prior were interviewed by telephone. Measures included: Cancer Diagnostic Interview Scale, Anxiety subscale of the Hospital Anxiety and Depression Scale, Posttraumatic Stress Disorder Checklist – Civilian Version, Center for Epidemiologic Studies Depression Scale, and ad hoc items regarding memory for, and satisfaction with, the diagnostic consultation. After controlling for demographic and clinical variables, the three CDIS subscales accounted for 12% of the variance in women's PCL-C scores (F change = 3.46, $p < 0.05$). The CDIS-Caring subscale was a significant predictor in the 'best-fit' regression model for each of the three indices of long-term distress (all B's > −0.23, $p < 0.05$). In contrast, the CDIS-Competence subscale was not a significant predictor in any of the 'best-fit' models. Additionally, women's satisfaction with physician behavior during the diagnostic consultation was unrelated to all adjustment measures (r's < 0.10, p's > 0.50). Findings suggest that women's perceptions of physicians' interpersonal skills during the diagnostic consultation are associated with later psychological adjustment. Copyright © 2002 John Wiley & Sons, Ltd.

INTRODUCTION

To some extent, there has always been interest in the physician's 'bedside manner'. It is no surprise that people have always tended to prefer a physician who is not only knowledgeable but is also pleasant and caring. In recent years, however, a new question has emerged: Is the physician with a good bedside manner actually good for your mental health? Can he/she have a major impact on how well you cope with a chronic illness, a painful procedure, or a poor prognosis?

Preliminary research suggests that a physician's interpersonal and communication skills are, in some way, associated with patients' psychological adjustment. In a study by Lerman *et al.* (1993), 84% of breast cancer patients reported difficulties in communicating with their medical teams. Although the average severity of the communication problems was relatively low, more communication problems predicted more disturbance in patient mood three months after the diagnosis, even when initial distress was controlled. Similarly, Silliman *et al.* (1998) found that breast cancer patients' ratings of their physicians' communication skills significantly predicted patients' general and cancer-specific psychological health.

It has also been suggested that certain communication events, such as the disclosure of significant information (e.g. test results, diagnosis, prognosis), are so important that the physician's interpersonal manner during this encounter, alone, might set a patient on a certain coping trajectory. The topic of 'breaking bad news' has become quite popular recently. There are many articles in

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medical journals that offer advice to physicians on how to handle difficult disclosure situations in the most psychologically healthy manner for the patient (e.g. Girgis and Sason-Fisher, 1998). However, only three empirical studies can be found that actually test whether there is a substantial relationship between the physician's communication in a 'bad news' consultation and patients' subsequent adjustment (Butow *et al.*, 1996; Omne-Ponten *et al.*, 1994; Roberts *et al.*, 1994).

Short-term psychological adjustment was associated with the patient's perception of the quality of communication during the disclosure of the cancer diagnosis in the study by Omne-Ponten *et al.*, (1994). They conducted semi-structured interviews with breast cancer patients 4 months, 13 months, and 6 years post-diagnosis. At all three time points, psychological adjustment was assessed using the Social Adjustment Scale. During the third interview, 6 years post-diagnosis, patients were asked whether their cancer diagnostic consultation had been a particularly negative interpersonal interaction. Patients who endorsed this item showed poorer psychological adjustment at the 4- and 13-month assessments but not at the 6-year assessment.

Butow *et al.* (1996) documented a relationship between patient satisfaction with communication in the cancer diagnostic consultation and patients' short-term psychological status. Psychological adjustment of breast cancer and melanoma patients was assessed 3 months after the cancer diagnosis, using the Psychological Adjustment to Cancer Scale. Patients' recollections of, and opinions about, their cancer diagnostic consultation were also assessed an average of 52 months (S.D. = 44 months) post-cancer-diagnosis. Women who reported more satisfaction with the physician's communication during the diagnostic consultation reported less psychological distress at 3 months post-diagnosis.

Roberts *et al.* (1994) reported a connection between cancer patients' perceptions of physician behavior at the time of the diagnostic consultation and patients' short-term psychological well-being. Using the Cancer Diagnostic Interview Scale, breast cancer patients' perceptions of the physician's behavior during the diagnostic consultation were assessed 6 months after breast surgery. Psychosocial adjustment was measured using the Global Severity Index (GSI) of the Symptom Check List-90-R (SCL-90-R). Women's perceptions of their physicians' use of basic psychotherapeutic techniques during the diagnostic consultation were related to psychological adjustment at 6 months post-diagnosis. Specifically, 21% of the variance in GSI scores was accounted for by patients' ratings of their physician's behavior during the diagnostic consultation. The more a patient reported that her physician was warm, caring, informative, and interpersonally skillful, the more likely she was to show better subsequent psychological adjustment. The authors concluded that the physician's use of basic psychotherapeutic techniques during the diagnostic consultation has a significant positive influence on the patient's well-being.

The results of these three studies suggest that cancer patients' perceptions of physician behavior and satisfaction with communication in the diagnostic consultation may be significantly associated with patients' short-term (i.e. 3–13 months post-diagnosis) psychological adaptation. This may be because the diagnostic consultation is an especially salient communication interaction. It marks the beginning of the individual's experience with a life-threatening disease, and possibly the beginning of a lengthy relationship with the physician who disclosed the news. A patient's experiences in the bad news consultation may set him or her on either a relatively positive or negative emotional trajectory, thereby influencing psychological well-being, at least in the short-term.

The relationship between cancer patients' perceptions of the diagnostic consultation and long-term psychological adjustment is less clear. Both Butow *et al.* (1996) and Roberts *et al.* (1994) examined only short-term psychological adjustment (i.e. 3–6 months post-diagnosis). While Omne-Ponten *et al.* (1994) found psychological adjustment at 13 months post-diagnosis to be associated with a negative perception of the diagnostic consultation, this relationship was not present for psychological adjustment at 6 years post-diagnosis. Unfortunately, their use of only a single dichotomous item to assess patients' perceptions of the diagnostic consultation may have weakened their ability to detect any existing relationship. Thus, the relationship between patients' perceptions of the diagnostic consultation and long-term psychological adjustment remains to be established.

In addition, it would be useful to know whether women's perceptions of the diagnostic

consultation are associated more with generalized psychological distress or with more specific adjustment problems, such as depression and/or PTSD-like symptoms. The three studies reviewed above all used only global measures of psychosocial adjustment (e.g. GSI index from SCL-90-R). At this time, it would be important to compare general measures with more specific measures, so that we may be able to pinpoint the psychological processes that may be affected by a physician's interpersonal manner.

Similarly, perceptions of physician behavior during the diagnostic consultation have also been assessed rather globally. As a result, little is known about the relationship between specific aspects of the diagnostic consultation and psychological adjustment. In particular, it may be important to differentiate between patients' perceptions of their physicians' technical competence during the interview and perceptions of the physicians' skill in managing the interpersonal aspects of the communication (e.g. emotional supportiveness and caring). Previous research has suggested that medical patients are capable of distinguishing among physicians' interpersonal, communication, and technical skills, and that these are among the most important dimensions for determining patients' perceptions of the quality of medical care (Cockburn *et al.*, 1991; Di Matteo and Hays, 1980; Thom and Campbell, 1997; Wiggers *et al.*, 1990). Although research has documented the relative importance of these three factors for patient outcomes such as satisfaction (Wiggers *et al.* 1990), trust in the physician (Thom and Campbell, 1997), and compliance with medical recommendations (Willson and McNamara, 1982), no research to date has compared the importance of these factors with regard to patients' psychological adjustment.

In light of the above, the present study examines the relationship between specific aspects of breast cancer patients' perceptions of the diagnostic consultation and their long-term psychological adjustment outcomes. It is hypothesized that: (1) patients' overall perception of physician behavior during the diagnostic consultation will be positively associated with long-term psychological adjustment; and (2) perceptions of a physician's emotional supportiveness during the diagnostic consultation will be more strongly associated with psychological adjustment than perceptions of a physician's technical competence during the consultation.

METHOD

Design and procedure

Study participants were recruited from the Comprehensive Breast Care Center at the University of Kentucky Chandler Medical Center. To be eligible for study participation, a woman had to: (a) be ≥ 18 yr of age, (b) be 10–48 months post-diagnosis of breast cancer ($\leq$ Stage IIIA), (c) be at least 3 months post-treatment (surgery, chemotherapy, and radiation) for breast cancer, (d) be in disease remission, and (e) have no previous history of cancer, other than basal cell skin carcinoma. Eligible women were identified from a research screening questionnaire completed during a routine clinic visit. One hundred eligible women were sent letters describing the study and inviting them to participate; also enclosed in the mailing were two copies of an informed consent form and a stamped, return envelope. Women interested in participating in the study were instructed to read and sign the consent forms, then to return one copy by mail. In addition to the letter, most women also received a follow-up telephone call, intended to answer women's questions about the study and to encourage their participation. Following receipt of a woman's signed consent form, the woman was called and a telephone interview was scheduled. Copies of all study measures were then mailed to the woman and she was instructed to use them as visual aids during the telephone interview. The woman was then called at the appointed time and all study measures were completed. All interview data was recorded manually by the interviewer during the interview. The interviewer was not involved in any aspect of the woman's medical care. Upon completion of the interview, disease and treatment information was extracted from participants' medical records. All study procedures were approved by the local medical institutional review board.

Of the 100 women sent letters inviting them to participate in the study, 65 completed interviews. Reasons for non-participation in the study were as follows: 13 women expressed disinterest in the study; nine women reported they were too busy to participate; five stated that they were unable to participate due to other health problems; five did not respond to the letter and were not reachable by telephone; and three indicated that they did not want to take part in the study because they

disliked talking about their experiences with breast cancer. Of the 65 women interviewed for the study, five were excluded from analyses because they were later found to not meet all eligibility criteria.

Participants

The final study sample consisted of 60 women, ranging in age from 27 to 82 years at the time of the study ($M = 53.7$; S.D. = 11.2). Each had received an initial diagnosis of breast cancer 10–48 months previously ($M = 28$ months, S.D. = 10.5). Most women (87%) had been diagnosed with stage 0–II breast cancer. Seven percent of women had stage IIIa breast cancer, and disease stage data was unavailable for an additional 7% of the study sample. Specific treatments represented in the sample were: lumpectomy and radiation (20%); lumpectomy, radiation, and chemotherapy (27%); mastectomy alone (22%); mastectomy and chemotherapy (23%); and some other combination of treatments (8%). Demographic characteristics of the study sample were as follows: 97% were Caucasian, 75% were married, and 43% were currently employed. Participants had a mean of 13.9 years of education (S.D. = 3.0). Women's annual household income was as follows: less than $20,000 (22%), $20,000–$40,000 (22%), $40,000–$60,000 (24%), and more than $60,000 (30%). Income data was unavailable for the remaining 2% of the study sample.

Materials

Sociodemographic information was collected from each participant during the telephone interview. In addition, the following standardized instruments were completed by all respondents: the Anxiety subscale of the Hospital Anxiety and Depression Scale (HADS), the Center for Epidemiologic Studies Depression Scale (CES-D), the Posttraumatic Stress Disorder Checklist - Civilian Version (PCL-C), and the Cancer Diagnostic Interview Scale (CDIS).

The 7-item Anxiety subscale of the Hospital Anxiety and Depression Scale (HADS; Zigmond and Snaith, 1983) was used to determine the extent to which women currently experience general anxiety and psychological distress. The HADS has been administered by telephone interview in previous studies (e.g. Helgeson *et al.*, 2000). Sample items include "I get sudden feelings of panic" and "Worrying thoughts go through my mind". Women were asked to respond on a four-point scale, according to how often they have felt that way during the past week. Scores on the Anxiety subscale of the HADS (HADS-Anx) range from 0 to 21. In studies with cancer patients, a cut-point of 8 has been shown to be ideal, yielding a sensitivity of 72–75% and a specificity of 75–81% for identifying significant psychological distress (Kugaya *et al.*, 2000; Razavi et al., 1990). Coefficient alpha in the present study was 0.91.

Participants' current depressive symptoms were measured using the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). The CES-D has been administered by telephone interview in previous studies (e.g. Gonzalez *et al.*, 1995; Lin *et al.*, 1992). The CES-D is a 20-item instrument that assesses a variety of cognitive, affective, behavioral, and somatic symptoms associated with depression. Respondents use a four-point scale to indicate how frequently they experienced depressive symptoms during the preceding week. Sample items include: "I felt that everything I did was an effort," and "My sleep was restless." CES-D scores range from 0 to 60. A cut-point of 21 was found to be ideal for identifying major depression in older patients; it has a sensitivity of 92% and a specificity of 87% (Lyness *et al.*, 1997). Coefficient alpha in the present study was 0.93.

Cancer-related PTSD symptomatology was assessed using the Posttraumatic Stress Disorder (PTSD) Checklist – Civilian Version (PCL-C; Weathers *et al.*, 1991). The PCL-C has been administered by telephone interview in previous studies (e.g. Manne *et al.*, 1998; Andrykowski *et al.*, 2000). The PCL-C is a 17-item instrument that assesses the degree to which an individual currently experiences certain trauma-related anxiety symptoms. The items directly correspond to the diagnostic criteria listed in the Diagnostic and Statistical Manual of Mental Disorders—Fourth Edition (American Psychiatric Association, 1994) for the diagnosis of PTSD. For each PCL-C item, respondents use a five-point Likert scale to indicate the extent to which they have been bothered by that problem during the past month. All women completed the PCL-C with reference to a specific potentially traumatic event, in this study, 'the diagnosis and treatment of breast cancer' (cf., Andrykowski *et al.*, 1998; Smith *et al.*, 1999). It yields a total score and three subscale scores

corresponding to the primary symptom clusters comprising PTSD. Coefficient alpha for the PCL-C total score in the present study was 0.93. Scores on the PCL-C range from 17 to 85. The most efficient cut-off score is 50; this yields a sensitivity of 0.78–0.82 and a specificity of 0.83–0.86 for identifying people who meet the criteria for a formal PTSD diagnosis (Weathers *et al.*, 1991; Blanchard *et al.*, 1996).

The Cancer Diagnostic Interview Scale (CDIS; Roberts *et al.*, 1994) is an 18-item scale that uses a five-point Likert scale response format to measure the degree to which the respondent perceived her physician as having used psychotherapeutic techniques while conducting the cancer diagnostic consultation. The CDIS has been administered by telephone interview in one previous study (Roberts *et al.*, 1994). Sample items include: "My doctor understood my fears and concerns", "My doctor discussed different treatments available for my type of cancer", and "My doctor did not take time to answer all my questions". Reliability estimates for the CDIS are as follows: Cronbach's alpha = 0.92 (Roberts *et al.*, 1994) and test–retest = 0.78 (C. S. Roberts, personal communication, June 3, 1997). Coefficient alpha in the present study was 0.94.

Two additional items were developed solely for use in this study. They assessed additional aspects of the breast cancer diagnostic consultation not measured by the CDIS. For one item (DC-Mem), women were asked to rate their memory for the diagnostic consultation. They responded using a 10-point Likert scale, with endpoints labeled 'very poor' and 'excellent'. For the other item (DC-Sat), women were asked to rate their satisfaction with the diagnostic consultation. They responded using a 10-point Likert scale, with endpoints labeled 'not satisfied at all' and 'extremely satisfied'.

Data analysis

Standard scoring procedures were used for the HADS-Anx, CES-D, PCL-C, and CDIS-Total. In addition, CDIS subscales were generated from a factor analysis of the CDIS, and factor-based scoring was then used to derive subjects' subscale scores. An orthogonal principal components analysis was conducted using varimax rotation. Based upon analysis of the eigenvalues and scree plots, three factors emerged. An item was retained on a factor if its highest loading was on that factor, if the factor loading was > 0.55 for that factor, and if the loading of that item on the other two factors was lower than the loading on the factor of interest by at least 0.20.

Examination of the items composing each of the three extracted CDIS factors suggests that the factors represent the following constructs: physician caring ('Caring'), physician technical competence ('Competence'), and degree of mutual understanding between physician and patient ('Understanding'). Items on the Caring subscale describe a physician who was comfortable with emotions and who spent adequate time with the patient, providing information and welcoming the patient's questions. CDIS items found to belong on this subscale were items 3 (doctor did not take time to answer my questions; reverse-scored), 5 (doctor encouraged my expression of feelings), 13 (wish doctor had given me more time to ask about my cancer; reverse-scored), 16 (doctor preferred to be emotionally detached; reverse-scored), and 17 (doctor appeared annoyed and impatient with my questions; reverse-scored). Coefficient alpha for the Caring subscale was 0.82.

The Competence subscale describes a physician who provides the patient with information about cancer-related tests, procedures, and treatments, and who instills in his/her patients a sense of faith or trust in the doctor. CDIS items found to belong on this subscale were items 6 (was given a lot of information), 8 (doctor discussed different treatments available), 9 (left the office feeling I was in good hands) and 10 (doctor explained the need for tests/procedures). Coefficient alpha for the Competence subscale was 0.85.

The Understanding subscale reflects the extent to which the patient understood the information provided by the doctor, in addition to how well the doctor seemed to understand feelings and concerns voiced by the patient. CDIS items found to belong on this subscale were items 1 (doctor understood my fears, concerns), 2 (felt hopeful after talking to doctor), and 11 (did not understand information doctor gave me; reverse-scored). Coefficient alpha was 0.74.

RESULTS

Descriptive characteristics

Women rated the cancer diagnostic consultation as a highly memorable event. The mean DC-Mem

score was 8.82 on a 10-point scale (S.D. = 1.30, range = 5–10). Forty-three percent of women rated their recall as 'excellent' (10/10) and 85% of women rated their recall very highly (≥ 8/10). No women reported very poor recall (≤ 4/10) for the cancer diagnostic consultation. There was no correlation between time since cancer diagnosis and memory for the diagnostic consultation ($r = -0.01$, n's). Overall, women indicated that they were moderately satisfied with the physician's communication in the diagnostic consultation (M DC-Sat score = 7.34, S.D. = 3.26, range 1–10). A majority of women (62%) indicated a high degree of satisfaction with the interaction (scores ≥ 8) while a sizable minority (16%) reported extreme dissatisfaction with the interaction (scores ≤ 3).

Descriptive statistics for the remaining primary study variables are shown in Table 1. Women's ratings of physician behavior during the diagnostic consultation were only moderately positive. The mean total CDIS score was 68.27. This translates into a mean CDIS item score of 3.79 (range 1–5). This suggests that the typical woman primarily gave ratings of 'neutral' to 'agree somewhat' to items asserting that the cancer diagnostic consultation had been a positive interpersonal interaction, given the stressful circumstances.

Inspection of scores for our measures of long-term psychological adjustment indicated that 47% of the sample scored above the cut-off on at least one measure. The HADS-Anx was the most commonly elevated measure; 45% of women scored ≥ 8 on this scale. Twenty-three percent of our sample scored ≥ 21 on the CES-D. Finally, 10% of our sample evidenced total scores ≥ 50 on the PCL-C.

There was a modest degree of comorbidity of psychological problems within our sample. Fifteen percent of women evidenced scores in the clinical range on two of the measures. Eight percent of women scored above the cut-off on all three psychological adjustment measures.

Table 1. Descriptive data for psychosocial variables

	M	S.D.	Obtained range	Possible range
CDIS Total	68.27	17.47	28–90	18–90
CDIS Caring	18.13	5.70	5–25	5–25
CDIS Competence	14.80	4.85	4–20	4–20
CDIS Understanding	11.16	3.40	4–15	3–15
HADS-Anx	7.83	4.96	0–2	0–21
CES-D	13.30	11.78	0–58	0–60
PCL-C	32.33	13.80	17–79	17–85

Univariate relationships among study variables

Pearson product moment correlations between and among our primary study variables and demographic (age, income) and clinical variables (time since diagnosis, disease stage) are shown in Table 2. There were strong associations among the diagnostic consultation variables. The CDIS scale and subscales were highly intercorrelated (all r's > 0.50, p's < 0.01). For example, women who described their physicians as more caring were also likely to describe him/her as more competent ($r = 0.71$, $p < 0.01$) and more understanding ($r = 0.57$, $p < 0.01$). Women's satisfaction with the diagnostic consultation was highly correlated with the CDIS scale and subscales. Women who perceived their physicians to be more caring, competent, and understanding during the diagnostic consultation reported more satisfaction with the interaction ($r = 0.56$, 0.55, and 0.63, respectively; all p's < 0.01). In contrast, women's memory for the diagnostic consultation was consistently not related to any of the other diagnostic consultation variables (all r's < 0.10).

Diagnostic consultation variables showed some associations with long-term psychological distress measures. There were significant or near-significant associations for all CDIS scales and for all three psychological adjustment measures. The outcome measure most associated with the CDIS scales seemed to be PCL-C scores. PCL-C scores were significantly associated with the CDIS Caring and Understanding subscales ($r = -0.32$, and $r = -0.28$, respectively, p's < 0.05). More physician caring and understanding was predictive of less long-term cancer-related PTSD symptomatology among the women in our sample.

CDIS Caring was the most important CDIS variable for predicting long-term psychological adjustment. In addition to the significant inverse association with PCL-C scores, CDIS Caring scores were also inversely correlated with CES-D scores. Women who perceived their physician to be more caring during the diagnostic consultation reported less long-term depressive symptomatology ($r = -0.28$, $p < 0.05$). Furthermore, there was a near-significant association between Caring and HADS-Anx scores. Women who described their

Table 2. Intercorrelation of demographic, clinical, and psychosocial variables

Variable	Variable (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Age (1)													
Income (2)	0.04												
Time since dx (3)	0.08	−0.23											
Disease stage (4)	−0.06	−0.48*	0.15										
CDIS-total (5)	0.09	−0.13	0.05	−0.05									
CDIS-caring (6)	0.09	0.03	0.00	−0.07	0.89**								
CDIS-competence (7)	0.15	−0.05	0.02	0.06	0.87**	0.71**							
CDIS-understanding (8)	0.07	−0.13	0.11	−0.02	0.77**	0.57**	0.53**						
DC-Mem (9)	0.07	−0.15	−0.01	0.12	−0.05	−0.03	−0.05	0.03					
DC-Sat (10)	−0.06	−0.23	0.15	−0.01	0.77**	0.56**	0.55**	0.63**	−0.02				
HADS-Anx (11)	−0.17	−0.37**	−0.22	0.06	−0.11	−0.25	−0.11	−0.19	0.05	0.01			
CES-D (12)	−0.25*	−0.41**	−0.12	0.09	−0.09	−0.28*	−0.15	−0.07	−0.02	0.09	0.80**		
PCL-C (13)	−0.29*	−0.36**	−0.22	0.04	−0.22	−0.32*	−0.22	−0.28*	0.05	−0.05	0.87**	0.79**	

*$p<0.05$, **$p<0.01$.

physician as more caring during the diagnostic consultation tended to report fewer generalized anxiety symptoms ($r = -0.25$, $p = 0.06$). Although only three of twelve correlations between CDIS scores and psychological distress measures reached statistical significance and three additional correlations reached near-significance, it was noted that all twelve correlations were in the hypothesized (inverse) direction. In contrast to women's perceptions of physicians' behavior during the cancer diagnostic consultation, women's memory for, and satisfaction with, the diagnostic consultation were consistently unrelated to all psychological distress measures (all p's > 0.50).

Multivariate prediction of long-term psychological adjustment

To examine the relationship between perceptions of physicians' behavior during the diagnostic consultation and women's subsequent psychological adjustment, three parallel hierarchical multiple regression analyses were performed. Dependent variables were the total scores on the HADS-Anx, the CES-D, and the PCL-C. At step 1 in each analysis, four control variables were entered as a block: women's age at time of interview, annual household income, time between diagnosis and study interview, and disease stage at diagnosis. At step 2 in each analysis, the three CDIS subscale scores were entered as a block. Results are shown in Table 3.

Table 3. Beta weights and summary statistics for hierarchical multiple regression analyses predicting psychological adjustment

	Outcome variable		
	HADS-Anx	CES-D	PCL-C
Step 1:			
Age	−0.13	−0.22	−0.24*
Income	−0.52**	−0.52**	−0.51**
Time since diagnosis	−0.31*	−0.21	−0.27*
Disease stage at diagnosis	−0.15	−0.14	−0.20
ΔR^2	0.28	0.29	0.30
F change	5.38**	5.56**	5.81**
Step 2:			
CDIS caring	−0.25	−0.34*	−0.25
CDIS competence	0.16	0.08	0.10
CDIS understanding	−0.17	0.06	−0.21
ΔR^2	0.08	0.07	0.12
F change	2.05	1.90	3.46*
Total model			
R^2	0.36	0.36	0.41
F	4.13**	4.15**	5.25**

*$p<0.05$, **$p<0.01$.
Beta weights shown are for full, seven-variable model.

The four control variables accounted for 28.1% of the variance in HADS-Anx scores (multiple $R = 0.53$; $F = 5.38$; $p<0.01$). Entry of the three CDIS subscale scores into the equation resulted in a non-significant 7.6% increment in the variance in

HADS-Anx scores accounted for [$F(3, 52) = 2.05$, $p = 0.12$]. In all, the full seven-variable model accounted for 35.7% of the variance in HADS-Anx total scores [$F(7, 52) = 4.13$, $p < 0.01$]. Annual household income (beta = −0.54) and time since diagnosis (beta = −0.29) were the only significant predictors of HADS-Anx scores (p's < 0.05).

The four control variables accounted for 28.8% of the variance in CES-D scores (multiple $R = 0.54$; $F = 5.56$; $p < 0.01$). Entry of the three CDIS subscale scores into the equation resulted in a non-significant 7.0% increment in the variance in CES-D scores accounted for $F(3, 52) = 1.90$, $p = 0.14$]. In all, the full seven-variable model accounted for 35.8% of the variance in CES-D total scores [$F(7, 52) = 4.15$, $p < 0.01$]. Annual household income (beta = −0.51) and CDIS caring (beta = −0.34) were the only significant predictors of CES-D scores (p's < 0.05).

The four control variables accounted for 29.7% of the variance in PCL-C scores (multiple $R = 0.55$; $F = 5.81$; $p < 0.01$). Entry of the three CDIS subscale scores into the equation resulted in a significant 11.7% increment in the variance in PCL-C scores accounted for [$F(3, 52) = 3.46$, $p < 0.05$]. In all, the full seven-variable model accounted for 41.4% of the variance in PCL-C total scores, F (7, 52) = 5.25, $p < 0.001$. Age (beta = −0.26), annual household income (beta = −0.48) and time since diagnosis (beta = −0.29) 0.29) were the only significant predictors of PCL-C scores (p's < 0.05).

To determine the 'best-fit' predictive model for each of our three long-term adjustment measures, individual variables from the seven-variable model described above were eliminated in stepwise, backward fashion (Table 4). The criterion for eliminating variables from the model was set at $p = 0.10$. The 'best-fit' model for predicting HADS-Anx scores accounted for 30.1% of the variance [$F(3, 56) = 8.06$, $p < 0.001$]. Significant individual predictor variables included: income (beta = −0.45), time since diagnosis (beta = −0.32), and CDIS Caring (beta = −0.23), all p's < 0.05.

The 'best-fit' model for predicting CES-D scores accounted for 33.3% of the variance [$F(4, 55) = 6.88$, $p < 0.001$]. Significant individual predictor variables included: income (beta = −0.45) and CDIS Caring (beta = −0.25), p's < 0.05.

The 'best-fit' model that emerged accounted for 36.3% of the variance in PCL-C scores [$F(4, 55) = 7.83$, $p < 0.001$]. Significant individual predictor variables included: age (beta = −0.22), income (beta = −0.40), time since diagnosis (beta = −0.30), and CDIS Caring (beta = −0.29), all p's < 0.05.

Table 4. Beta weights and summary statistics for 'Best Fit' multiple regression analyses predicting psychological adjustment

	Outcome variable		
	HADS-Anx	CES-D	PCL-C
Age	—	−0.20	−0.22*
Income	−0.45**	−0.45**	−0.40**
Time since diagnosis	−0.32**	−0.21	−0.30*
Disease stage at diagnosis	—	—	—
CDIS caring	−0.23*	−0.25*	−0.29**
CDIS competence	—	—	—
CDIS understanding	—	—	—
R^2	0.30	0.33	0.36
F	8.06**	6.88**	7.83**

*$p < 0.05$, **$p < 0.01$.

DISCUSSION

The purpose of this study was to learn how breast cancer patients' experiences during the diagnostic consultation might be related to their subsequent long-term psychological adjustment. We found that patient satisfaction with physician behavior during the diagnostic consultation was unrelated to all measures of women's long-term psychological adjustment. In contrast, some evidence suggested that women's descriptions of their physician's behavior during the diagnostic consultation were significantly associated with long-term adjustment. Specifically, consideration of the three CDIS subscale scores yielded a significant 12% increment in variance accounted for in PCL-C scores beyond that accounted for by demographic and clinical variables (Table 3). Additionally, scores on the CDIS-Caring subscale were a significant predictor in the 'best fit' regression model for each of our three indices of long-term adjustment (Table 4).

Our first hypothesis predicted that women's overall perceptions of physician behavior during the diagnostic consultation would be positively associated with their long-term psychological adjustment. This hypothesis received partial support. The three CDIS subscales yielded an increment of 7–12% in variance accounted for in our

three indices of long-term psychological adjustment, with the 12% increment in variance for PCL-C scores attaining statistical significance (Table 3). These findings are generally consistent with the previous work of Roberts *et al.* (1994). Their study showed that women who perceived physician behavior in the diagnostic consultation that is thought to be more psychotherapeutic also tended to have better short-term psychological adjustment. The present study extends these findings in two ways: by demonstrating that there may still be a modest effect of physician behavior in the *long-term* post-cancer phase, and by suggesting that the effect may be greater on certain *specific* psychological symptoms (i.e. PTSD) than on generalized psychological distress (e.g. HADS).

In contrast, univariate analyses indicated no significant relationship between patients' satisfaction with the diagnostic consultation and any of our indices of long-term psychological adjustment. Previous research has established a relationship between patient satisfaction with the diagnostic consultation and patients' psychological well-being during the short-term, post-cancer phase, but not in the long-term recovery period. Butow *et al.* (1996) demonstrated that satisfaction was positively associated with better adjustment 3 months post-diagnosis. Omne-Ponten *et al.* (1994) found a significant association between satisfaction and adjustment 4 and 13 months post-diagnosis, but no such association 6 years post-diagnosis. When taken together, our present findings and past research lead us to conclude that perceptions of physician behavior during the diagnostic consultation, not patients' satisfaction with physician behavior, are predictive of breast cancer patients' long-term psychological adjustment.

Perception of physician behavior is probably a better predictor of long-term psychological adjustment than patient satisfaction because it seems to be a more reliable and valid indicator of the patient's experience during the diagnostic consultation. The 18-item CDIS is a list of specific physician behaviors that may or may not have occurred during the diagnostic consultation. The multi-item, multi-dimensional, behaviorally-based nature of the CDIS makes it a better measure than the evaluative, single-item measure that is used to assess global patient satisfaction. The construct measured by the CDIS, 'psychotherapeutic' behavior, also borrows from a stronger theoretical and empirical base (i.e. the psychotherapy literature) than does the construct of patient satisfaction. Researchers have recently expressed great concern over the lack of understanding for the variable of patient satisfaction. They claim that it is a complex, multidimensional variable, which does not yet have an adequate theoretical formulation (Avis *et al.*, 1995; Carr-Hill, 1992; Strasser *et al.*, 1992). Others have noted that global ratings of patient satisfaction with medical care tend to be quite high, to be lacking in variability, and to be generally unrelated to efficacy of intervention or patient psychological adjustment (Baider *et al.*, 1997; Oberst, 1984; Wiggers *et al.*, 1990). In this light, perhaps it should not be surprising that we found patient satisfaction with the cancer diagnostic consultation to be unrelated to patients' subsequent psychological distress.

The second study hypothesis was that perceptions of a physician's emotional supportiveness during the diagnostic consultation would be more strongly associated with psychological adjustment than perceptions of a physician's technical competence during the consultation. Our study results strongly support this hypothesis. The CDIS Caring subscale score was a significant predictor of psychological adjustment in all three of our 'best fit' regression models (Table 4). In contrast, the CDIS Competence subscale was not a significant predictor for any of our three indices of long-term adjustment. Thus, women who perceived that their physician expressed more caring and emotional supportiveness when telling them about their cancer diagnosis tended to have fewer cancer-related PTSD symptoms, less depression, and less general distress. However, this was not true for perceptions of physicians' technical skills; the extent to which a woman perceived her physician as technically competent was not predictive of her long-term psychological well-being. This is a novel finding, since no previous research has examined the relative importance of physicians' technical versus interpersonal competence for patients' subsequent psychological adjustment. Previously, groups of primary care patients and cancer patients have indicated that interpersonal and technical skills are highly- and equally-important components of a physician's professional competence (Thom and Campbell, 1997; Wiggers *et al.*, 1990). Compared to this literature, our results diverge, by suggesting that patients' perceptions of physicians' interpersonal manner have more bearing when it comes to patients' long-term emotional health.

Although this study has a number of strengths, it also has limitations that warrant acknowledgement. First, the study is correlational, so no definitive statements can be made about causal relationships between our study variables. Although our underlying hypothesis could be true (i.e. that physician behavior during the diagnostic consultation plays a causal role in determining women's long-term psychological adjustment), there are other possible explanations for the association we found between physician behavior and patient adjustment. One reasonable alternative hypothesis is that patients' recollections of the cancer diagnostic interview are more a function of the person's current psychological status than of the actual event. Distressed individuals may tend to recall and report all kinds of events and situations more negatively than they would if they were not suffering from psychological problems. Since we measured women's *perceptions* of physician behavior (not physician behavior directly), we cannot rule out the possibility of this explanation.

Another hypothesis is that the relationship is a function of the patient's psychological status at the time of the diagnostic consultation and its effects on the physician. Given the relative stability of psychological functioning, it is reasonable to think that women with psychological distress or maladjustment 2 yr after cancer may also have been distressed at the time of their diagnoses. Some physicians may find it aversive to interact with patients who are very upset or who have difficult personality styles; physicians may find it hard to use their best interpersonal skills with such patients during a cancer diagnostic consultation.

Essentially, then, the direction of effect could be from physician behavior to patient adjustment, vice versa, or bi-directional. Of course, the only way to clarify this issue would be to experimentally manipulate the patients' experience in the cancer diagnostic consultation. However, this is precluded by obvious ethical and practical constraints. Therefore, our correlational design, although not scientifically ideal, was necessary and is informative. The problem of possible confounds was addressed in our analyses by statistically controlling for known risk factors for maladjustment.

There are several measurement issues that may threaten the validity of these study findings. One potential problem is the retrospective nature of women's reports of their diagnostic consultation. Women were asked to provide their recollections of an event that had occurred from 1 to 4 yr prior. Memory decay, alone, could produce flawed reports of women's experiences. If memory problems were widespread in this study sample, it would significantly decrease confidence in our results. However, the women who participated in this research project reported very high confidence in their memory for their cancer diagnostic consultation. This is consistent with other research involving cancer patients (e.g. Peteet *et al.*, 1991) and supports the notion of a 'flashbulb' memory phenomenon, wherein people have extraordinary recall of traumatic or highly emotional events in their lives (Brown and Kulik, 1982).

Another potential study weakness lies in its reliance upon self-report in the measurement of physician behavior during the diagnostic consultation. Clearly, it would be important to examine the relationship between more objective indices of physician behavior, such as those derived from observational data, and indices of subsequent adjustment. However, it should also be noted that what is likely critical to subsequent adjustment is a woman's *perception* of her physician's behavior and not necessarily the behavior, itself. Reliance upon subjective or objective indices of physician behavior alone is likely to yield an incomplete perspective.

In contrast, when taken together, findings from subjective and objective studies of physician behavior during the diagnostic consultation might yield important implications. For example, our study used subjective ratings and demonstrated that cancer patients who perceived their physician to be more caring during the cancer diagnostic consultation tended to have better long-term psychological adjustment. Future research involving both subjective and objective measures of physician behavior may show that patients' perceptions of physician caring and interpersonal skills are significantly impacted by actual physician behavior. Together, these findings would suggest that rates of patient psychological maladjustment following cancer might be decreased by enhancing physician behaviors that patients view as 'caring' during important communication interactions, such as the cancer diagnostic consultation.

There are probably many ways to increase the likelihood that physicians will exhibit caring behavior during diagnostic consultations. Campbell and Sanson-Fisher (1998) spelled out a detailed, five-step approach to changing physician behavior in terms of 'bad news' disclosure. They

advocated the need for: (1) the establishment of clear, professional guidelines on conducting diagnostic consultations, (2) the widespread dissemination of the guidelines, (3) provision of performance-based feedback for physicians, (4) incentives to physicians to provide best practice care, and (5) active exploration and remediation of obstacles to high quality care in the diagnostic consultation. One such obstacle to physicians conveying emotional support to patients during the diagnostic consultation could be their general skill deficits in the interpersonal and psychosocial domains. Perhaps it will be important to improve physicians' formal training in communication and interpersonal skills and in the psychosocial aspects of health and illness. For physicians in training, this could be incorporated into the medical school curriculum and residency programs. For physicians in practice, training might be done through brief courses or workshops addressing these issues. Two recent studies demonstrated the efficacy of such interventions (Fallowfield *et al.*, 1998; Hulsman *et al.*, 1997). Other methods for improving physicians' caring behavior may require change at a systems level. For example, changes in health care administration (e.g. managed care) that lead to decreased time pressures and emotional stress levels for physicians might be indicated, since these factors are likely related to physicians' capacity for displaying caring behavior toward their patients. Although this list is by no means exhaustive, it represents some of the clinical implications that may follow from continued research in the area of 'bad news' communication in cancer care.

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Running Head: Impact of Benign Breast Biopsy

Psychological Impact of Benign Breast Biopsy:

A Longitudinal, Comparative Study

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In press: Health Psychology (Please do not quote without permission)

Abstract

The impact of benign breast biopsy (BBB) upon distress and perceptions of risk for breast cancer (BC) was examined. Telephone interviews were conducted with 100 women after notification of biopsy results and again at four and eight months post-biopsy. Women in the BBB group evidenced greater BC-specific distress at baseline relative to matched healthy comparison (HC) women without biopsy. No differences were found for general measures of distress, BC risk perceptions, or a measure of the impact of worry about BC upon quality of life. BC-specific distress declined following BBB but remained elevated relative to the HC group at the eight month interview.

Several dispositional (optimism, informational coping style), demographic (education), clinical (family history of BC), and cognitive (BC risk perception) variables were associated with baseline levels of BC-specific distress or persistence of distress over time. Results provided support for the Monitoring Process (Miller, 1995) and Cognitive Social Health Informtion Processing (Miller, Shoda, & Hurley, 1996) models of response to health-threatening events.

KEY WORDS: Biopsy, Psychosocial, Behavioral, Breast Cancer, Detection, Diagnosis

The value of early detection and diagnosis has been demonstrated for a variety of cancers, including those of the breast, colon, prostate, and cervix. For these cancers, early detection and diagnosis is associated with significant reductions in disease-related mortality and morbidity. As a result, people are encouraged to participate in cancer screening activities such as pap smear testing, mammography, PSA testing, or digital rectal exam.

While the benefits of early detection and diagnosis are well recognized, it is less well recognized that participation in cancer screening and diagnostic activities can have a negative psychological impact even when a malignancy is not found (Lerman, Rimer, & Engstrom, 1991; Wardle & Pope, 1992). Concern has been raised about the negative impact of an abnormal or equivocal screening test result (Lerman, Trock, Rimer, Jepson, et al., 1991). Here, test results raise the possibility that a malignancy might be present or do not immediately reassure that a malignancy is not present. All cancer screening tests yield a certain proportion of such results. Fortunately, the majority of abnormal or equivocal test results are not due to the presence of a malignancy. This does not imply, however, that the impact of such test results is completely benign. Rather, the individual is likely to experience uncertainty regarding their health status. This uncertainty may be associated with significant anxiety. Abnormal or equivocal screening test results likely challenge the routine belief that one is healthy and force the individual to confront the possibility they may have a potentially life-threatening, malignant disease. Some have suggested that anxiety may remain for months or even years after abnormal or equivocal test results (Lerman, Trock, Rimer, Boyce, et al., 1991).

Abnormal or equivocal test results are a common occurrence in breast cancer (BC) screening Up to 20% of mammograms performed in large-scale screening programs yield abnormal or inconclusive results (Lerman, Trock, Rimer, Jepson, et al., 1991; Winchester, Lasky, Sylvester, & Maher, 1988). Follow-up is typically warranted and might simply involve a repeat mammogram. However, some abnormal results require a diagnostic surgical procedure, such as excisional breast biopsy or fine needle aspiration (FNA), to rule out malignancy. Positive biopsy rates from series of

surgical biopsies range from 10-40% (Alexander, Candela, Dershaw, & Kinne, 1990; McCreery, Frankl, & Frost, 1991). Thus, most breast biopsy results are benign, that is, no malignancy is found.

While a woman is undoubtedly relieved that no breast malignancy was found, the biopsy experience may not be completely benign. Rather, benign breast biopsy (BBB) may have distinct negative psychological consequences. These include lingering distress and exaggerated perceptions of personal risk for BC. For some women, the psychological impact can be profound. For example, 5 of 30 women who underwent BBB in a study of the impact of a "false positive" mammogram described this experience as the "worst" event of their life (Gram, Lund, & Slenker, 1990).

While the psychological consequences of BBB are potentially significant, research examining the impact of BBB is sparse. Few studies have focused upon BBB, per se. Rather, most studies have examined the impact of participation in a BC screening program in general (Baines, To, & Wall, 1990; Bull & Campbell, 1991; Cockburn, Staples, Hurley, & De Luise, 1994; Ellman et al., 1989; Swanson, McIntosh, Power, & Dobson, 1996) or have examined the impact of an abnormal mammography result in particular (Austoker & Ong, 1994; Brett, Austoker, & Ong, 1998; Gram et al., 1990; Lerman, Trock, Rimer, Boyce, et al., 1991; Lerman, Trock, Rimer, Jepson, et al., 1991; Lowe, Balanda, Del Mar, & Hawes, 1999; Ong & Austoker, 1997; Ong, Austoker, & Brett, 1997; Smith, Botha, & Goosey, 1991).

Not surprisingly, studies of the impact of an abnormal mammography result suggest the presence of elevated distress following notification of the need for additional follow-up (Austoker & Ong, 1994; Baines et al., 1990; Ong & Austoker, 1997; Smith et al., 1991; Swanson et al., 1996). However, whether distress remains elevated after additional follow-up rules out malignancy is unknown. Elevated levels of distress have been found at follow-up assessments one (Lowe et al., 1999), three (Lerman, Trock, Rimer, Boyce, et al, 1991; Lerman, Trock, Rimer, Jepson et al., 1991) five (Brett et al., 1998), eleven (Ong et al., 1997), and eighteen months (Gram et al., 1990)

following an abnormal mammogram result. In contrast, other investigators have found an abnormal mammogram result yields only a transitory increase in distress that dissipates within a few weeks or months (Bull & Chamberlain, 1991; Cockburn et al., 1994; Ellman et al., 1989).

Diagnostic surgical procedures such as breast biopsy or FNA are typically employed for those abnormal results for which the index of suspicion is highest. Thus, it might be assumed that BBB is potentially more stressful than the experience of an abnormal screening result that is not followed by breast biopsy. Not surprisingly, studies have documented the presence of considerable anxiety and distress while awaiting the biopsy procedure (Benedict, Williams, & Baron, 1994; Lowe et al., 1999; Northouse, Jeffs, Cracchiolo-Caraway, Lampman, & Dorris, 1995; Northouse, Tocco, & West, 1997; Swanson et al., 1996) and while awaiting notification of biopsy results (Chen et al., 1996). However, few studies have examined psychological outcomes after notification that biopsy results are benign. Deane and Degner (1998) assessed 70 women soon after they learned their biopsy result. Compared to normative data, women experienced heightened anxiety and uncertainty even after being informed of their benign result. Ellman et al. (1989) found 37.5% of a sample of 17 women who had undergone BBB evidenced "probable psychiatric morbidity" three months after BBB. In contrast, probable psychiatric morbidity was found in only 19% of women receiving a normal mammogram result and 18% of women who underwent additional clinical follow-up but who did not undergo BBB. Lindfors, O'Connor, Acordelo, and Liston (1998) compared the psychological status of 80 women having short interval follow-up mammography after detection of a benign breast lesion with 58 women who underwent BBB. Four to six months later, women in the BBB group reported greater stress than the follow-up mammography group. Brett et al. (1998) assessed women in a screening mammography program one and five months after mammography. At the five month follow-up, 10% of women who received a normal mammogram result evidenced "adverse psychological consequences." Among 64 women receiving an abnormal mammogram result followed by a benign biopsy or FNA, the proportion of women evidencing adverse psychological consequences was 61% and 44%,

respectively. These proportions were lower than those evident at the one month follow-up, suggesting that deleterious effects of BBB might dissipate over time. Finally, Stanton and Snider (1993) assessed mood pre- and post- breast biopsy in 117 women, 81 of whom received a benign diagnosis. Demographic variables (primarily less education) were the only significant predictors of post-BBB negative affect.

In sum, little is known regarding the psychological impact of BBB, per se. The few studies that have focused upon BBB suggest elevated distress may be a consequence of BBB. However, these studies are generally limited both methodologically and conceptually. Methodological limitations include small samples, assessment of distress at only a single post-BBB follow-up, failure to assess longer term (e.g., > 6 months) BBB outcomes, failure to control of family history of BC in the analyses, and reliance upon global distress measures. Conceptually, research has been limited by a focus upon the simple documentation of distress after BBB with little attempt to identify variables accounting for variance in psychological response. Research has also been atheoretical, with no attempt to use theory to guide selection of predictor or outcome variables.

A theoretical model relevant to BBB is the Monitoring Process Model (MPM; Miller, 1989; Miller, 1995; Miller Rodoletz, Schroeder, Mangan, & Sedlacek, 1996). According to the MPM, individuals differ with regard to informational coping style, that is, the extent and manner to which they seek health relevant information and respond to threatening events. Individuals characterized by a monitoring coping style (i.e., monitors) tend to actively scan the environment for health relevant information. Those characterized by a blunting style (i.e., blunters) tend to avoid or minimize health relevant information. Under conditions of low threat, monitors and blunters do not differ much with regard to cognition, affect, or behavior. However, when confronted with a threatening health event, such as breast biopsy, differences emerge. Monitors are likely to respond with distress due to their tendency to actively seek information and to amplify threat both cognitively and emotionally. Blunters are less likely to evidence distress because they tend to avoid and blunt threatening health information.

The tendency to respond to life events with optimism or pessimism may also affect response to BBB. Dispositional optimism is a set of generalized expectancies for positive or negative future outcomes and predicts coping behavior and physical and psychological response to threatening events (Scheier & Bridges, 1995; Scheier & Carver, 1985). It might be expected that women low in dispositional optimism might respond to BBB with increased distress and perceptions of BC risk.

The purpose of the present study is to identify the psychological impact of BBB. In contrast to most previous research, the present study employs a longitudinal design and a comprehensive set of outcome measures. In addition to documenting the occurrence of distress in response to BBB, the present study seeks to identify demographic, clinical, and psychological variables associated with individual differences in psychological outcomes, both initially and across time. We predicted that: (a) BBB will result in elevated levels of distress and perceptions of personal BC risk relative to healthy women without a history of BBB; (b) women with a monitoring coping style will evidence greater and more persistent distress in response to BBB; and (c) women characterized by low dispositional optimism will evidence greater and more persistent distress in response to BBB.

Methods

Sample

Potential participants in the Benign Breast Biopsy (BBB) group were identified from the roster of patients at the University of Kentucky Comprehensive Breast Care Center. Eligibility criteria for the BBB group included: (a) $\geq$ 18 years of age; (b) scheduled to undergo a breast biopsy or FNA for diagnostic purposes; (c) no prior history of BC, breast biopsy or FNA; (d) able to read and understand English; (e) telephone in the home, and (f) written informed consent.

Using these criteria, 143 women in a consecutive series were identified as study eligible between December, 1996 and November, 1997. Of these, 129 (90%) provided written consent for

study participation. Of the 14 women who declined participation, most cited being "too busy" or "too stressed" as the reason. Fifteen women who provided consent were later deemed ineligible for study. These included 7 women diagnosed with BC, 3 women who did not complete the initial interview, and 5 women did not complete the initial interview within 50 days of BBB. Seventy-six women from the community were recruited to form a Healthy Comparison (HC) group. Eligibility criteria for the HC group were: (a) $\geq$ 18 years of age; (b) no history of BC, biopsy or FNA; (c) able to read and understand English; (d) telephone in the home, and (e) written informed consent for participation.

Procedure

Potential participants in the BBB group were identified from the daily clinic roster of the Comprehensive Breast Care Center. Prior to undergoing a biopsy or FNA, eligible women were introduced to the study by the physician managing her care. Women were then given a detailed explanation of the study by a research staff member. Written informed consent for study participation was then obtained. Following notification of biopsy or FNA results, women with benign findings were telephoned by a research staff member and an Initial Interview scheduled. The Initial Interview was conducted via telephone and was completed a mean of 21.4 days (SD=9.9; range=2 to 47) following biopsy or FNA. Additional telephone Follow-up Interviews were conducted 4 and 8 months after a woman's biopsy or FNA procedure.

Participants in the HC group were recruited through a variety of community print media advertisements. Advertisements solicited women who were interested in participating in a study of women's health. Interested women telephoned the project office and were screened for study eligibility. Eligible women were then scheduled for an Initial Interview conducted by telephone. All women in the HC group were paid $15.00 for completion of the study interview.

Assessment protocol

During the Initial Interview, both the BBB and HC groups completed measures to assess: (a) demographic and BC risk variables; (b) dispositional variables; (c) social support; (d)

psychological distress; (e) BC worry; and (f) perceived BC risk. At the 4 and 8 month Follow-Up Interviews the BBB group again completed section "d" of the assessment protocol. The BBB group also completed sections "e" and "f" at the 8 month Follow-Up. In addition, two of every three women in the BBB group were randomly assigned to complete sections "e" and "f" at the 4 month Follow-Up Interview.

Demographic and BC Risk Variables. Information obtained included age, race, marital status, education, and annual household income. Information for estimating both relative (Gail et al., 1989) and lifetime (Benichou, 1993) risk for BC was obtained including age at menarche, parity, history of BBB, and number of first degree relatives (FDR's) with BBB.

Dispositional Variables. These included the Miller Behavioral Styles Scale-Short Form (MBSS-SF; Steptoe, 1989), a measure of informational coping style yielding Monitor and Blunter subscales, and the Life Orientation Test (LOT; Scheier & Carver, 1985), a measure of dispositional optimism. Coefficient alpha was .63 for the MBSS Monitor subscale and .83 for the LOT

Social Support. Women completed the 8-item Duke-UNC Functional Social Support Questionnaire (DUKE-SSQ; Broadhead, Gehlbach, De Gruy, & Kaplan, 1988), a measure of current affective social support. Coefficient alpha was .83.

Psychological Distress. Measures of general distress included the 20-item Center for Epidemiologic Studies Depression Scale (CESD; Radloff, 1977), a measure of current depressive symptoms and the 37-item short form of the Profile of Mood States (POMS-SF; Shacham, 1983), a measure of current mood disturbance yielding a total mood disturbance score. Women also completed the 15-item Impact of Events Scale (IES; Horowitz, Wilner, & Alvarez, 1979), a measure of current avoidant and intrusive cognition regarding a specified stressor – in this case "the possibility that you will develop BC in your lifetime." Used in this manner, the IES can be seen as a measure of psychological distress or preoccupation specific to BC. The IES yields Intrusion and Avoidance subscale scores. Coefficient alpha was .92 for the CESD, .85 for the POMS-SF, and .87 and .90 for IES Avoidance and Intrusion scores, respectively.

BC Worry. Worry regarding BC was assessed using items adopted from previous research (Cunningham et al., 1998; Lerman, Trock, Rimer, Jepson, et al., 1991). Women indicated how often they "worried about getting BC someday" (BC-Worry), Responses were made on a 5 point Likert scale ranging from "not at all" (coded as 0) to "almost all of the time" (coded as 4). Women also indicated how much "worrying about BC affected your mood" and how much "worrying about BC affected your daily activities." For both questions, responses were made on a 4 point Likert scale ranging from "not at all" (coded as 0) to "a lot" (coded as 3) Responses to these latter two BC worry items were highly correlated (r=.64) and they were summed to form a 2-item composite index of BC worry impact (BC-Worry Impact) (cf., Lerman, Trock, Rimer, Jepson et al., 1991).

Perceived BC Risk. Two subjective estimates of lifetime risk for BC were obtained. As in previous research (Lerman et al., 1995), women estimated their personal lifetime risk for BC by providing a percentage between 0-100% in response to the question "What are the chances that you will develop BC some day?" (Personal BC Risk). Women also estimated typical lifetime risk for BC by providing a percentage between 0-100% in response to the question "What are the chances that the average woman your age will develop BC some day?" (Typical BC Risk) (Andrykowski et al, in press). The Personal and Typical BC Risk items were combined to form a Comparative BC Risk index. This was accomplished by subtracting Personal BC Risk from Typical BC Risk for each woman.

Data Preparation and Analysis

Standard procedures were used to compute scale and subscale scores for the MBSS-SF, LOT, CESD, IES, and DUKE-SSQ. An alpha level of .05 was used as the criterion for statistical significance. Interaction effects in regression analyses were investigated using methods suggested by Jaccard, Turrisi, and Wan (1990). To reduce multicollinearity, all variables were standardized prior to use in the regression analysis (Cohen & Cohen, 1983). The form and nature of any significant interaction effects was then determined using methods suggested by Jaccard et al. (1990).

Results

BBB and HC groups

While 114 women completed the Initial Interview within 50 days of their BBB, only 100 women completed all 3 scheduled study interviews. These 100 women constituted the BBB group in subsequent study analyses. The majority of the BBB group (62%) underwent a breast biopsy while the remainder underwent an FNA (31%) or underwent both biopsy and FNA procedures (7%). Comparison of these 100 women with the 14 women who failed to complete one or both follow-up interviews revealed no significant differences with regard to age, education, relative and lifetime BC risk, # of FDR's with BC, or IES, POMS, or CESD scores at the Initial Interview (all p's >.10). However, women who did not complete both follow-up interviews were more likely to be noncaucasian (X^2 (1) = 20.53; p<.001) and to report greater perceived personal risk for BC at the Initial Interview (t (110)=3.33; p<.01).

Demographic and clinical characteristics for the BBB and HC groups are shown in Table 1. Chi-Square and t-test analyses indicated that the BC and HC groups did not differ with regard to age, race, number of FDR's with BC, annual household income, employment or marital status (all p's > .05). However the HC group was significantly more educated than the BBB group (t (175) = 3.46; p < .01) and the BBB group had a higher objective lifetime risk for BC than the HC group (t (186)=4.41; p<.001). This is not surprising as BBB increases estimates of lifetime BC risk (Benichou et al, 1993).

Reactions to Biopsy: Immediate Impact

To examine the immediate impact of BBB, responses of the BBB and HC groups at the Initial Interview were compared using a series of two-group analyses of covariance. Covariates included lifetime risk of BC and years of education. Dependent variables included total scores on the POMS, CESD, LOT and DUKE-UNC, Intrusion and Avoidance scores on the IES, Monitor and Blunter scores from the MBSS, BC-Worry and BC-Worry Impact scores, and the Personal, Typical, and Comparative BC RISK variables. Results are shown in Table 2. The two groups differed only

insofar as the BBB group evidenced higher scores on the Intrusion and Avoidance subscales of the IES (all p's < .05).

To test our hypotheses regarding the relationship between dispositional characteristics, specifically optimism and informational coping style, and psychological distress after BBB, a set of three hierarchical regression analyses was performed. IES Intrusion and Avoidance scores were the dependent variables as these were the only distress indices that were sensitive to the BBB experience (see Table 2). To ensure a conservative test of our hypotheses, clinical (# of FDR's with BC, lifetime risk for BC (Benichou, 1993)),demographic (age, education, race), and social support (Duke-UNC Total) variables were employed as covariates. (Interaction terms with these 6 covariates and the Group, MBSS-Monitor, and LOT-Total variables were constructed and examined for their relationship to IES indices. As no significant relationships were found, none of these interaction terms were included in the primary analyses.) Three "main effect" variables were included in the regression analyses: LOT-Total and MBSS-Monitor scores and a dichotomous Group variable indicating whether a woman was in the BBB or HC group. Three two-way interaction terms (Group * LOT, Group * Monitor, LOT * Monitor) and a three way interaction term (Group * LOT * Monitor) representing the combinations of these three main effect variables were also computed and employed in the analysis.

Results for the full 13-variable regression models are shown in Table 3. The set of 13 variables accounted for a significant portion of the variance in IES-Intrusion (36.2%; $F(13, 162) = 7.06$; $p < .001$) and IES-Avoidance (37.2%; $F(13, 162) = 7.39$; $p < .001$) scores. Education was a significant predictor of both IES indices with less education associated with greater IES scores (both p's $\leq .01$). The # of FDR's with BC was a significant predictor of IES-Avoidance scores with a greater # of FDR's with BC associated with greater IES Avoidance scores ($p < .05$). Most importantly, the Group * LOT * Monitor triple interaction was a significant predictor of both IES-Avoidance and Intrusion scores (both p's < .05). Inspection of the variance independently attributable to each variable in the regression model (i.e., square of semipartial correlation

coefficient) indicated that this triple interaction independently accounted for 1.9% of the variance in IES-Avoidance scores and 1.8% of the variance in IES-Intrusion scores. This amount was consistently exceeded only by education, which independently accounted for about 8-10% of the variance in the two IES indices, and by the LOT*Monitor interaction which independently accounted for about 2-3% of the variance in the two IES indices. Inspection of the form of the Group * Lot * Monitor interaction for IES Intrusion and Avoidance scores revealed a highly similar pattern. In general, a LOT * Monitor interaction was evident only in the BBB group. In the BBB group, informational coping style was most strongly associated with higher IES scores when optimism was low. When optimism was low, the highest IES scores were reported by individuals with a high monitoring informational coping style. When optimism was high, much smaller differences between high and low monitors were evident. Figure 1 illustrates the form of the Group * LOT * Monitor interaction for the IES-Avoidance score. The form of the Group * LOT * Monitor interaction for IES-Intrusion scores was essentially the same as that for IES-Avoidance scores shown in Figure 1.

Reactions to Biopsy: Change Across Time

To examine whether BC-specific distress changed over time in the BBB group a set of one-way, repeated measures, analyses of variance (ANOVA) was performed. TIME (three levels: Initial, 4 month, and 8 month Follow-Up) was the within subjects independent variable in all ANOVA's. The dependent variables were total scores on the POMS, and CESD and Intrusion and Avoidance scores on the IES. Analyses for these five variables were based on the sample of 100 women with complete data at all 3 time points. Results are shown in Table 4. Results indicated a significant main effect for TIME for IES-Intrusion (Wilks lambda =.871; $F(2, 98)=7.27$; $p<.001$) and IES-Avoidance (Wilks lambda=.845; $F(2, 98)=9.02$; $p<.001$) scores. Post hoc analyses using the Least Significant Difference (LSD) test indicated that for both IES indices, scores at the 4 and 8 month assessments were significantly lower than scores at the Initial interview (all p's < .001). IES scores at the four and eight month assessments were not significantly different from each other. In contrast, there was no significant main effect for TIME for CESD or POMS total scores (both p's

> .25).

A similar set of repeated measures ANOVA's were performed using the BC-Worry, BC-Worry Impact and the Personal, Typical, and Comparative BC Risk measures as dependent variables. Analyses for these five variables were based upon the 68 women who provided complete data for these variables at all three time points. (Comparison of these 68 women with the 32 women randomly assigned to not complete the BC worry and risk perception measures at the 4 month follow-up revealed no significant differences on demographic or objective BC risk variables, or on distress and BC worry indices or perceived BC risk at the Initial Interview (all p's >.10.) Results are shown in Table 4. Results indicated no significant main effects for TIME for BC-Worry, BC-Worry Impact, or any BC risk perception indices (all p's > .15).

While preceding analyses suggested IES Intrusion and Avoidance scores for the BBB group decreased between the Initial and 4 month Follow-Up interview, different patterns of change were evident when individual women were considered.. For example, 13 women evidenced an <u>increase</u> in their IES-Avoidance score of at least 0.5 standard deviation between the Initial and 4 month Follow-Up interviews. To identify variables accounting for individual differences in change in IES scores after BBB, a pair of identical multiple regression analyses were employed. Dependent variables were raw change in IES Avoidance and Intrusion scores between the Initial and Four month Follow-up Interviews. Eleven predictor variables were employed in all three analyses. These included the appropriate IES score at the Initial Interview, demographic (race, age, education), objective and subjective BC risk (lifetime risk for BC (Benichou, 1993), # of FDR's with BC; perceived personal BC risk), dispositional (MBSS-Monitor and LOT-Total scores, LOT * Monitor interaction) and social support (DUKE-UNC Total) variables.

Results are shown in Table 5. The set of 11 predictor variables accounted for a significant proportion of variance in change between the Initial and 4 Month Interviews for both IES Avoidance (39.7%) and Intrusion scores (44.3%). Not surprisingly, IES scores at the Initial Interview were significantly associated with change for both IES indices with higher IES scores at the Initial

Interview associated with larger decreases in IES scores after the Initial Interview. In addition, perceptions of personal BC risk and social support (both assessed at the Initial Interview) were associated with change in IES Avoidance scores after the Initial Interview. Specifically, higher perceptions of personal BC risk were associated with smaller decreases in IES Avoidance scores following the Initial Interview while greater social support was associated with larger decreases. An identical pattern of results for these two predictor variables was also evident for change in IES-Intrusion scores, however, results narrowly failed to achieve the .05 criterion for statistical significance (both p's < .10). Finally, greater education was significantly associated with larger decreases in IES-Intrusion scores (beta = .21; p<.05).

Discussion

Study results provide support for our hypothesis that BBB may have a negative psychological impact. Specifically, comparison of the BBB and HC groups at the Initial Interview indicated that the BBB group evidenced significantly higher IES Intrusion and Avoidance scores (see Table 2). Group differences on both IES indices were in the range of 0.5 standard deviation in size – a reasonably large effect. To place our IES scores in context, our mean Intrusion and Avoidance scores at the Initial Interview of approximately 8.0 and 10.5, respectively, are a bit lower than the mean Intrusion (11.1) and Avoidance (12.8) scores found in a sample of BC survivors a mean of 2 years after completion of BC treatment (Cordova, Cunningham, Carlson, & Andrykowski, 2001).

In contrast to our findings for the IES, no differences between the BBB and HC groups were found at the Initial Interview for scores on the POMS and CESD. This apparent discrepancy might be resolved by considering the specificity of distress assessed by these instruments. The POMS and CESD are generic measures of distress as they are not keyed to assess distress associated with any specific stressor. In contrast, the IES, as used in this study, can be considered a measure of BC-specific distress or preoccupation. In particular, the IES measured distress associated with

"the possibility that you will develop BC in your lifetime." As BBB is likely to engender anxiety regarding personal risk for BC, it is not at all surprising that the IES appeared to be highly sensitive to the impact of BBB whereas generic measures of depressive symptoms (CESD) and mood disturbance (POMS) were not. Using this rationale, however, it is puzzling that significant group differences were not found on the BC-Worry and BC-Worry Impact measures. However, these were fairly crude one and two item indices, respectively. The failure to obtain group differences on these measures might be attributable to poor measurement rather than the absence of true differences between the BBB and HC groups. Considered together, it seems fair to conclude that the experience of BBB may only increase BC-specific distress or preoccupation. The extent to which this increased BC-specific distress impacts upon quality of life more generally is not known, however, and might be a focus for future research.

Examination of the temporal trajectory of BC-specific distress or preoccupation within the BBB group indicated that distress declined over time (Table 4). Significant declines in IES scores were evident between the Initial and Four Month Follow-up Interview with no further significant declines evident after that. It is important to note, however, that while BC-specific distress levels 4 to 8months after biopsy are lower relative to those evidenced in the immediate aftermath of BBB (i.e., at the Initial Interview), BC-specific distress is still significantly elevated over normal, pre-BBB levels. T-test comparison of IES Avoidance and Intrusion scores for the BBB group at the Four and Eight month assessments to those of the HC group at the Initial Interview revealed significant group differences (all p's $< .05$). Whether BC-specific distress ultimately returns to a baseline, pre-BBB level is not known as follow-up in the present study extended only to eight months post-BBB. However, even if distress levels do indeed eventually return to normal, that distress remains significantly elevated for at least eight months following BBB is not trivial. From a quality of life standpoint, our findings suggest that consideration be given to identifying ways to help women manage the distress generated by BBB.

In general, our results are consistent with those of earlier studies which have found elevated

levels of distress in women following BBB (Brett et al., 1998; Deane & Degner, 1998; Ellman et al, 1989; Lindfors et al., 1998). Our results are also consistent with the single study which has examined the course of distress following BBB in suggesting that distress declines over time (Brett et al., 1998). Again, however, it is critical to note that the potential negative impact of BBB was evident only when we considered IES scores. No significant differences between the BBB and HC groups and no significant evidence of change over time were apparent when CESD or POMS scores were considered. The methodological implications of this are straightforward: a comprehensive understanding of the psychological impact of a particular stressful event is facilitated by inclusion of both generic and stressor-specific measures. In this case, inclusion of only generic measures of distress in our assessment protocol would have resulted in a quite different conclusion regarding the psychological impact of BBB. One might note that our recommendation here is similar to that regarding use of a modular approach to quality of life assessment (Aaronson, 1991). That is, consideration of both generic and disease specific measures is necessary to yield a comprehensive view of quality of life.

In contrast to the apparent impact of BBB upon BC-specific distress or preoccupation, our data suggest that perceptions of BC risk were largely unaffected by BBB. No significant differences were found between the BBB and HC groups at the Initial Interview with respect to perceptions of either their personal risk for BC or the typical woman's risk for BC (see Table 2). Furthermore, in the BBB group, neither measure of BC risk perception changed significantly during the eight month follow-up period and intercorrelations among BC risk estimates were fairly high, in the .60 to .80 range, across the different points of assessment . As ours is the first study to examine how BBB affects BC risk perceptions, these results require replication before firm conclusions can be drawn.

As hypothesized, optimism and informational coping style were associated with response to BBB. However, the hypothesized main effect relationships between these dispositional characteristics and distress after BBB were not found. Rather, our results suggested a significant interaction between these two variables with regard to post-BBB distress (Figure 1). Specifically,

the hypothesized relationship between a monitoring coping style and greater post-BBB distress was most evident in the context of low optimism. A monitoring coping style was much less strongly associated with BC-specific distress when optimism was high. Furthermore, it is critical to note that the interaction between optimism and a monitoring coping style was evident only in the BBB group. This was evidenced by the significant Monitor*Lot*Group three-way interaction. (Table 3 and Figure 1).

Our results are thus consistent with the MPM insofar as informational coping style was associated with BC-specific distress only in the BBB group. This supports the MPM's contention that the effects of informational coping style upon cognition, affect, and behavior are evident primarily under conditions of threat, in this case, experience of BBB (Miller, 1995; Miller, Rodeletz, et al., 1996). Additionally, our results support the broader conceptualization of response to threatening health events provided by the Cognitive-Social Health Information Processing Model (C-SHIP; Miller, Shoda, & Hurley, 1996). In part, the C-SHIP model posits that the general tendency of monitors to amplify threat both cognitively and emotionally can be modified by other dispositional characteristics. In essence, the C-SHIP model suggests monitoring subtypes may exist. In particular, optimism is suggested as a dispositional characteristic that may moderate the monitor's typical response to a threatening health event (Miller, 1995; Miller, Mischel, O'Leary, & Mills, 1996). Because of their general expectancy for positive outcomes (Scheier & Carver, 1985), optimists might avoid the cognitive and emotional amplification of threat associated with a monitoring style. Thus, monitors with high optimism may be less less prone to react with distress when facing a threatening health event. Our finding of a significant LOT*Monitor interaction is clearly consistent with this thesis.

In addition to the interaction of optimism and informational coping style, education and, to a lesser extent, family history of BC, were predictive of IES scores in the BBB group (Table 3). Women with less education evidenced higher IES Intrusion and Avoidance scores at the Initial Interview while women with a history of BC in one or more FDR's evidenced higher IES Avoidance

scores only. In addition, higher perceptions of personal BC risk and poorer social support at the Initial Interview were linked to smaller declines in IES scores over the eight months following BBB (Table 5). While specific hypotheses were not advanced, none of these findings are surprising. Both education and social support can serve as coping resources (Hobfoll, 1989), mitigating the negative impact of BBB. Alternatively, more educated women might receive more information and explanation from physicians and clinic staff and this may serve to minimize distress following BBB. Women with a family history of BC are likely to believe they are at greater risk for breast cancer. Indeed, women with one or more FDR's with BC reported significantly higher perceptions of personal BC risk at the initial interview relative to women without a family history of BC (41.5% vs. 26.8%; $p<.05$). Undergoing BBB is likely to further heighten this sense of vulnerability and personal risk, resulting in elevated and more persistent BC-specific distress. Finally, our finding that higher personal BC risk estimates were associated with smaller declines in IES-Total and IES-Avoidance subscale scores is consistent with our previous research linking higher personal BC risk estimates to greater risk of nonadherence with recommendations for clinical follow-up after BBB (Andrykowski et al., in press).

While we believe this report to be the most comprehensive examination of psychological response to BBB, several limitations of the research should be noted. First, our sample was 90% caucasian and replication of our findings in a racially and ethnically more diverse sample would be prudent. Second, there is some suggestion that minority women and women with elevated perceptions of personal BC risk at the Initial Interview were less likely to complete all study assessments. As a result, caution is advised in generalizing study results to all women undergoing BBB. Third, the lack of a baseline assessment prior to BBB limits the ability to draw firm conclusions about the causal impact of BBB. While inclusion of our matched HC group suggests that BC-specific distress is elevated as a result of BBB, differences between the HC and BBB groups at baseline could be due to some unmeasured factor and not directly attributable to BBB. Use of a true prospective design would be advised in future studies. Fourth, while our HC group

allowed some insight into "baseline" levels of our outcome variables, this group may not have been the optimal control group for this setting. Inclusion of a group of women undergoing BC screening and receiving a "normal" result would have yielded a better perspective upon the psychological impact of BBB. In particular, this group could shed light on whether BC-specific distress or preoccupation might be temporarily elevated in these women as well, simply as a function of the screening process itself. Fifth, the large number of analyses conducted and the less than optimal ratio of predictor variables to sample size (i.e., < 10:1) suggest that further replication of our findings is necessary. Finally, we focused upon the BC screening setting and our findings may not be generalizeable to screening for other cancers.

In conclusion, our results suggest that the experience of breast biopsy may produce increased levels of BC-specific distress, even when no malignancy is found. Significantly, distress remains elevated at least eight months following BBB. Women most likely to evidence elevated and/or persistent distress following BBB can be identified by a combination of dispositional (optimism, monitoring coping style), clinical (family history of breast cancer), cognitive (perceptions of personal BC risk), social (social support), and demographic (education) variables. In addition, other research suggests that BSE practices may be altered after BBB (Haefner, Becker, Janz, &Rutt, 1989; Janz, Becker, Haefner, Rutt, & Weissfeld, 1990) and elevated distress and perceptions of personal BC risk after BBB are associated with nonadherence to recommendations for clinical follow-up of BBB (Andrykowski et al., in press). Thus, reactions to BBB may have quality of life as well as health behavior implications. While the potential negative impact of BBB does not appear to be of sufficient magnitude to recommend reexamination of guidelines for its use, we do believe that additional examination of its negative impact is warranted. Rather than reducing use of biopsy in the evaluation of breast lesions, we suggest that attention be devoted to the development of brief, psychoeducational interventions to enhance post-BBB psychological and behavioral outcomes. Such interventions could be based upon similar efforts in related settings (Lerman et al., 1995; Miller et al., 1997).

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Table 1.

Demographic and Clinical Characteristics For BBB (n=100) and HC (n=76) Groups.

	BBB Group			HC Group		
Variable	M	(SD)	Range	M	(SD)	Range
Age (in years)	44.2	14.0	19 - 84	45.3	14.2	21 - 82
Education (in years)	13.8	3.0	6 - 20	15.3	2.5	10 – 20 **
Relative Risk For BC (%)[a]	3.0	1.4	1.4 - 10.1	2.7	0.9	1.3 - 5.8
Lifetime BC Risk (%)[b]	10.4	5.0	2.7 - 34.2	7.7	3.3	1.0 - 17.1***
% Married or Partnered		72%			67%	
% Caucasian		90%			97%	
Family History of BC						
% With 1 FDR With BC		15%			12%	
% With ≥ 2 FDR's With BC		3%			0%	
Annual Household Income						
% < $20,000		34%			28%	
% $20,000 - $40,000		20%			22%	
% $40,000 - $60,000		16%			21%	
% > $60,000		26%			28%	
Medical Insurance						
% no insurance		12%			11%	
% Medicare/Medicaid		20%			10%	
% Private		68%			79%	

[a] From Gail et al. (1989); [b] From Benichou et al. (1993)

*** $p \leq .001$ ** $p < .01$ * $p < .05$

Table 2.

Covariate Adjusted Means and Standard Deviations for BBB (n=100) and HC Groups (n=76).

	BBB Group		HC Group		
Variable	M	(SD)	M	(SD)	F-value[a]
POMS-Total	42.1	24.4	42.5	25.0	0.14
CESD-Total	10.6	10.5	10.2	8.7	0.06
IES-Intrusion	7.0	8.2	4.0	5.6	7.16**
IES-Avoidance	9.2	9.6	5.8	8.0	6.09*
BC-Worry	1.2	1.1	1.4	0.9	0.88
BC-Worry Impact	2.0	2.3	2.2	1.6	0.36
DUKE-UNC Total	33.8	5.8	32.5	4.8	1.79
MBSS-Monitor	5.0	1.6	4.9	1.8	0.12
MBSS-Blunter	2.8	1.3	3.0	1.3	0.71
LOT-Total	30.4	4.9	30.5	5.3	0.00
Personal BC Risk	26.9	22.4	30.8	20.4	1.28
Typical Woman BC Risk	33.3	19.4	37.7	21.2	1.80
Comparative BC Risk[b]	6.4	20.1	6.4	19.4	0.00

[a] F-statistic associated with analysis of covariance with education and lifetime risk for BC (Benichou, 1993) as covariates

[b] Calculated as Typical Woman BC Risk minus Personal BC Risk

*** $p \leq .001$ ** $p < .01$ * $p < .05$

Table 3.

Multiple Regression Analysis of IES Scores for the BBB (n=100) and HC (n=76) groups.

	IES-Intrusion		IES-Avoidance	
Variable	beta[a]	sr square[b]	beta	sr square
Education	-.37***	.097	-.34***	.085
Age at Interview	.01	.000	-.10	.004
# FDR's With BC	.12	.005	.27**	.026
Lifetime Risk for BC	.12	.004	-.07	.001
Social Support	.05	.002	-.02	.000
Race[d]	.15**	.020	.08	.005
Group[e]	-.14*	.014	-.19**	.023
LOT-Total	.36*	.011	-.07	.000
MBSS-Monitor	.24	.005	.10	.001
Group*LOT	-.40*	.014	-.02	.000
Group*Monitor	-.16	.002	.01	.000
Lot*Monitor	-.55**	.027	-.55**	.026
Group*LOT*Monitor	.45**	.018	.46**	.019
Full Model Statistics				
Multiple R	.601		.610	
Multiple R^2	.362		.372	
F-statistic[f]	7.06***		7.39***	

[a] standardized beta coefficient for full, 13 variable model; [b] squared semi-partial correlation; [c] from Benichou (1993); [d] coded as 1=Caucasian and 2=other; [e] coded as 1=BBB group and 2=HC group; [f] df = 13, 162

*** p. ≤ 01 ** p ≤ .05 *p ≤ .10

Table 4.

Means and Standard Deviations for Psychological Distress and BC Risk Perception Measures at Three Assessment Points for the BBB Group (n=100).

	Initial Interview		4-Month Follow-up		8-Month Follow-up		
Variable	M	(SD)	M	(SD)	M	(SD)	F-value[a]
CESD-Total	11.4	(10.5)	11.6	(11.6)	11.0	(12.2)	0.17
POMS-Total	43.6	(24.3)	45.9	(27.7)	42.1	(27.8)	1.31
IES-Intrusion	8.0[b,c]	(8.2)	5.9[b]	(7.5)	5.2[c]	(7.1)	7.27***
IES-Avoidance	10.5[b,c]	(9.6)	7.4[b]	(8.8)	7.2[c]	(8.7)	9.02***
BC-Worry[d]	1.4	(1.2)	1.5	(1.1)	1.3	(1.2)	1.81
BC-Worry Impact[d]	2.5	(2.4)	2.4	(2.1)	2.1	(2.4)	1.19
Personal BC Risk[d]	32.6	(22.7)	33.5	(22.6)	35.4	(25.0)	0.77
Typical BC Risk[d]	35.4	(20.0)	33.6	(19.0)	34.2	(19.3)	0.40
Comparative BC Risk[d e]	2.7	(19.7)	0.1	(19.8)	-1.1	(21.1)	0.92

Note. Superscript letters associated with means indicate pairs of means which are significantly different ($p < .05$) from each other.

[a] F-statistic associated with value of Wilk's lambda in repeated measures analysis of variance;

[d] analyses based upon sample size of 68 subjects.

[e] calculated as Typical BC Risk minus Personal BC Risk

*** $p \leq .001$

Table 5

Multiple Regression Analysis of Change in IES Scores for the BBB Group Following the Initial Interview (n=100).

Variable	IES-Intrusion beta [a]	sr^2 [b]	IES-Avoidance beta	sr^2
Initial IES Score	.66***	.280	.62***	.221
Education	.21**	.026	.14	.012
Age at Interview	-.21	.014	-.06	.001
Lifetime Risk for BC[c]	-.28*	.019	-.20	.009
Race[d]	.13	.014	.09	.007
# FDR's With BC[e]	.20	.012	.11	.003
Social Support	.15*	.017	.19**	.028
Perceived BC Risk	-.16*	.020	-.20**	.033
LOT-Total	.06	.003	-.01	.000
MBSS-Monitor	-.11	.011	-.03	.001
Lot*Monitor	.05	.002	-.02	.000
Full Model Statistics				
Multiple R	.666		.630	
Multiple R^2	.443		.397	
F-statistic[f]	6.37***		5.27***	

Not

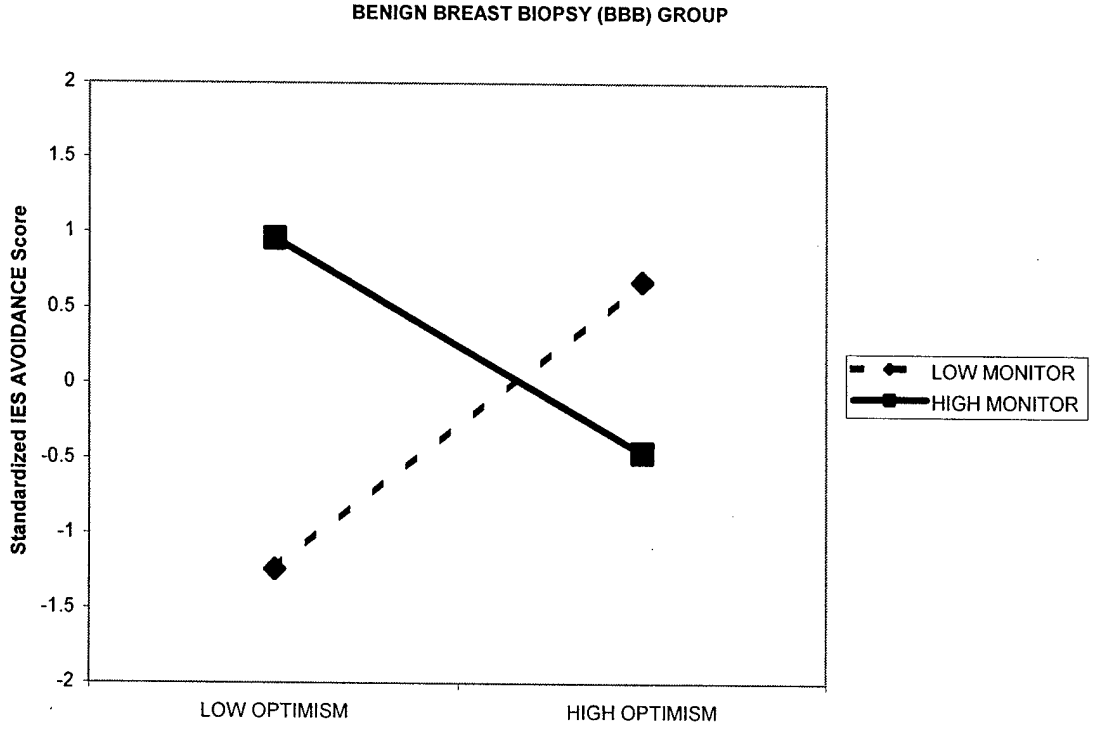
e. Change scores calculated as Initial level minus 4 month Follow-up level.

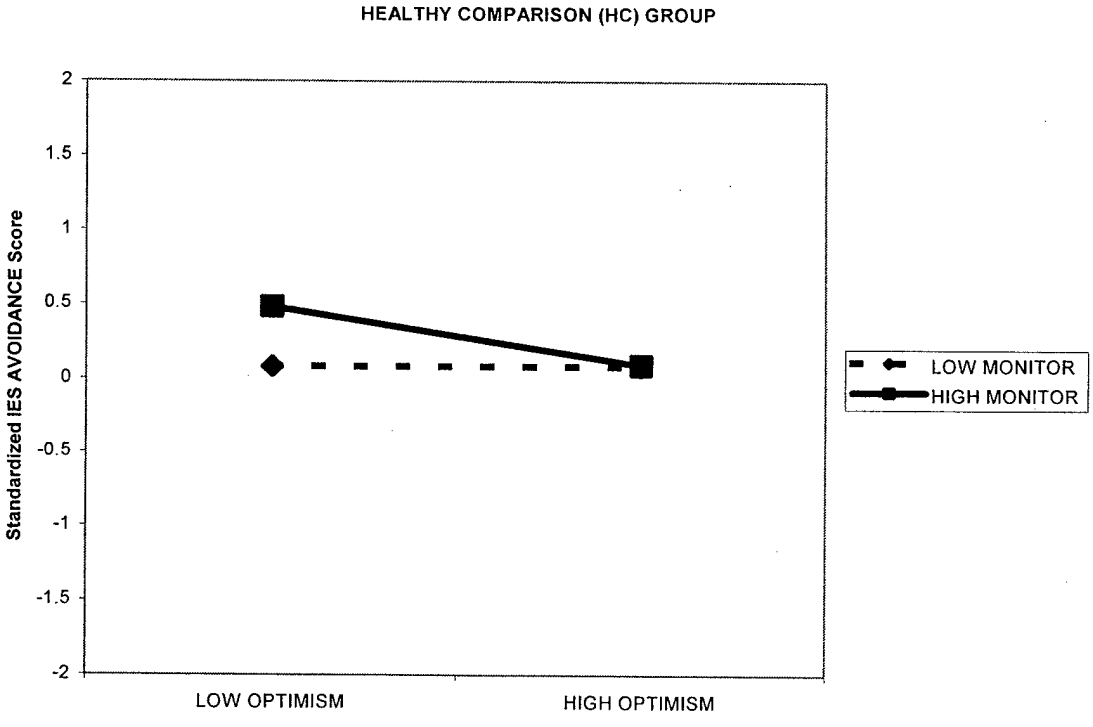
[a] standardized beta coefficient for full, 11 variable model; [b] squared semi-partial correlation; [c] from Benichou (1993); [d] coded as 1=Caucasian and 2=other; [e] defined as number of FDR's with breast cancer; [f] df = 11, 88

*** p. ≤ 01 ** p ≤ .05 *p ≤ .10

Figure Caption

Figure 1. IES Avoidance subscale scores at the Initial Interview for the BB and HC groups as a function of dispositional optimism and informational coping style.


BENIGN BREAST BIOPSY (BBB) GROUP
Standardized IES AVOIDANCE Score
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
LOW OPTIMISM
HIGH OPTIMISM
LOW MONITOR
HIGH MONITOR


HEALTHY COMPARISON (HC) GROUP
Standardized IES AVOIDANCE Score
2
1.5
1
0.5
0
-0.5
-1
-1.5
-2
LOW OPTIMISM
HIGH OPTIMISM
LOW MONITOR
HIGH MONITOR